SUPREME COURT OF THE UNITED STATES

OCTOBER TERM, 1916.

No. 179.

KIMEL PROCESS COMPANY,
Petitioner, Plaintiff.

v.

MINNESOTA AND ONTARIO PAPER COMPANY,
Respondent, Defendant.

BRIEF FOR PETITIONER.

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OCTOBER TERM, 1922.

No. 178.

EIBEL PROCESS COMPANY, PETITIONER, PLAINTIFF,

v.

MINNESOTA AND ONTARIO PAPER COMPANY,
RESPONDENT, DEFENDANT.

BRIEF FOR PETITIONER.

CHAPTER I.

GENERAL SUMMARY OF THE CASE.

This is a suit brought by the petitioner alleging infringement by the respondent of Eibel patent No. 845,224 issued February 26, 1907, for an improvement in Fourdrinier machines for making paper (Rec. p. 1011). The suit was brought in the United States District Court for the District of Maine and that court (Hale, J.) held the patent valid and infringed and ordered the usual injunction and accounting (267 Fed. 847; Pamphlet, p. 17).*

Upon appeal to the Circuit Court of Appeals for the

* For the convenience of the court we have printed as a separate pamphlet and submit herewith copies of the opinions of Judge Hale and of the Court of Appeals for the First Circuit in this case and a copy of the opinion of the Court of Appeals for the Second Circuit in *Eibel Process Company* v. *Remington-Martin Company*, 234 Fed. 624.

First Circuit that court reversed the decision of the District Court, and held the patent invalid on the ground that if the language of the patent is construed "according to its natural import" "there is no useful invention and no infringement", and if on the other hand the claims are construed in accordance with plaintiff's contention "they cover merely a degree" and are "void for indefiniteness" (274 Fed. 540, 555; Pamphlet, pp. 35, 61).

This decision of the Circuit Court of Appeals for the First Circuit was in conflict with a previous decision of the Circuit Court of Appeals for the Second Circuit holding the Eibel patent valid and infringed by machines built and operated in the same way as the machines of the present defendant (*Eibel Process Company* v. *Remington-Martin Company*, 234 Fed. 624, opinion written by Mayer, J., decided April 11, 1916, Pamphlet, p. 1), and a petition for a writ of *certiorari* to review the decision of the Court of Appeals for the First Circuit, was therefore presented to this Court, which petition was duly granted.

The Eibel invention is one of prime importance; it has been the means of vastly increasing the speed of paper production on Fourdrinier machines. The patent has been administered by the petitioner in a liberal spirit for the advantage of the industry, licenses having been granted to all paper mills applying for licenses upon equal terms and at a very moderate royalty. The licensees under the patent include the most important news paper mills in the country,—a list of fifteen of them being given at Rec. p. 36.

The defendant is the Minnesota & Ontario Paper Company, a Maine corporation, which operates a paper mill at International Falls, Minnesota. About a dozen other paper manufacturers, all of whom are presumably in-

fringing the Eibel patent, have contributed to the defense of the suit. A list of these contributing companies is to be found at Rec. p. 165.

BRIEF SUMMARY OF THE EIBEL INVENTION AND ITS HISTORY.

Eibel's invention relates to the well known Fourdrinier machine which is universally used for making news paper and often for making other grades of paper. The essential part of the Fourdrinier machine is an endless traveling wire sieve or "wire" having a breadth equal to the breadth of the sheet of paper desired, and a working length of some 30 or 35 feet. This sieve or wire travels over a series of rollers. Upon it is discharged, at the "breast-roll" end of the machine, a stream of paper-making stock which consists principally of water with admixed wood pulp fibres. As the stock travels with the moving wire toward the "guide-roll", the water drains through the wire gradually and the fibres become felted together on the wire until, by the time the guide roll is reached they are matted into a wet sheet having strength enough to be peeled off from the wire and to pass through a series of driers and calenders, from which the sheet emerges to be rolled up as finished paper.

The Fourdrinier is an extremely expensive machine, costing $100,000 or more, and is run day and night constantly in order that the utmost possible production may be obtained from the heavy investment. Speed of paper production is therefore of the utmost importance, and increase of speed has always been eagerly sought by the industry.

Eibel worked out the invention here in suit at Rhinelander, Wisconsin, where he was superintendent of the Rhinelander Paper Company.

Previous to the Eibel invention, the wire on Fourdrinier machines had always been run horizontally (subject to minor trifling variations from the horizontal, up or down, for drainage regulation, which we shall hereinafter discuss and which had nothing whatever to do with the matter of speed of the machine and involved no hint of Eibel's purpose or result).

At the date when Eibel's invention was made, the maximum speed at which it had been found possible to make paper on these machines was about 450 feet per minute. In some few instances, under especially favorable conditions, with the best machines, 500 feet per minute had been reached, but no greater speed than this had ever been successfully maintained. (The defendant claims that higher speeds than this had been made; but the evidence proves that where higher speeds had been tried, it had been found necessary to reduce them again to about 500 feet.) The limit in this respect was due to the fact that when greater speeds were attempted, the sheet of stock did not smooth out at the stage on the wire when felting becomes active but on the contrary it became a mass of waves and ripples at the critical point where the formation of the paper was irretrievably determined for good or for ill; and when that condition prevailed, the resulting paper was "wild" or irregular, frequently breaking down on the machine, and being unsaleable.

Eibel analyzed the conditions prevailing on these machines and made a *discovery* upon which his invention is based. That discovery was that *the reason for the excessive turbulence of the sheet when higher speeds were attempted was excessive difference of velocity between the speed of the stock and the speed of the wire at the critical stage on the wire.* In machines as then organized

there were only two factors tending to impart speed to the stock,—*first,* the *"head"* or hydraulic pressure due to the pond of stock back of the slices or gates under which the stock issued upon the wire, which gave the stock its initial velocity; and *second,* the *"drag"* or friction between the less rapidly moving stock and the more rapidly moving wire which tended to accelerate the velocity of the stock up to the higher velocity of the wire.

The extent of the head which it was possible to carry on machines as then constructed was very definitely limited on account of mechanical difficulties*, to about 6 or 8 inches which amount of head would give the stock an initial velocity as it entered upon the wire of only 325 to 380 feet per minute.

And the acceleration which drag could be relied upon to give to the stock after it entered upon the wire up to that stage on the wire where active felting takes place was also very definitely limited.

If the wire were run to make paper at 450 to 500 feet per minute, which was the maximum speed for paper machines at the time of Eibel's invention, then the wire would be moving at a speed about 100 or 125 feet greater than the speed of the stock coming out on the wire under a head of six to eight inches. This amount of speed difference between stock and wire was not so great that it prevented fairly good paper formation, because the

*These difficulties arose from the fact that the weight of the forward part of the pond of stock was carried by an "apron" which rested on the wire, and if too much weight was imposed on the wire, the table rolls carrying the wire were strained. In recent years it has become the practice to place the pond farther back, so that the slice comes directly over the breast-roll, and higher heads can therefore now be ~~carried on machines built in this manner (Rec. p. 157, X. Q. 88; p. 59~~, carried on machines built in this manner (*infra,* pp. 159-161).

"drag", *i. e.*, friction of the wire, was sufficient to accelerate the stock to this extent quickly enough so that speed equality and consequent quiescence of stock was accomplished before the stock had lost its fluidity and active felting took place. (Kinney, Rec. p. 558, Q. 105).

But when attempts were made to speed the wire to make paper faster than 450 or 500 feet per minute it was found that great commotion of the stock resulted, with consequent irregularity or "wildness" in the paper, and if pushed too far this resulted in abnormal tearing and breakage of paper on the machines, causing frequent stoppages of the machines as well as unmerchantable paper.

The sum of the stock speeds which could be imparted by these two definitely limited factors, head and drag, thus fixed the limit at which the speed of the wire could be practically maintained, and so fixed the limit of speed at which paper could be produced.

Eibel, having discovered what the reason was for the turbulence of the stock which imposed the limitation on the speed at which the machine could be run, conceived the radically new thought of adding to the two speed-producing factors then in use, namely, head and drag, a *third* factor, namely, *gravity due to a downwardly pitched wire.* He gave the wire a steep downhill pitch from breast roll to guide roll, and so called in as a new accelerating factor, co-operating with and aiding those already at work on the machine, gravity acting on the stock during its course down the wire. The amount of the pitch was, of course, variable, depending upon the speed at which the wire was to be run, and was so calculated as, when operating in conjunction with the other factors of the machine, to bring the stock up to speed equality with the wire at the critical point of

paper formation, so as to do away with waves and ripples at that point and make the sheet smooth out properly. The pitch was therefore co-related to the desired wire speed.

At one stroke Eibel thus did away completely with the limitation on the speed of the machines which had been holding back the progress of the art.

Other limiting factors, of course, still remained, such as the strength of machine parts, the capacity of the driers, the ability of the workmen to handle the paper at higher speeds, etc., but *so far as the question of turbulence of stock with resulting wildness of paper was concerned, that limitation had been done away with forever.*

Eibel thus invented both a machine and a process. His machine, while resembling in all other details the previously known Fourdrinier machine, differed from it in the vitally important respect that it had a steeply inclined wire. His new process consisted, broadly speaking, in using the force of gravity acting on the stock on a downwardly pitched wire as a means of accelerating the stock to speed equality with the wire, this new speed-giving factor being used of course in co-operation with the previously known factors, head and drag.

This in very brief outline is Eibel's invention.

The courts have very seldom had to do with an invention which has done so much for the practical arts as that of Eibel.

The patent issued in 1907.

The news of it spread (to quote defendant's own witnesses) "like wildfire" through the trade, the report of "this Rhinelander scheme of raising the wire" being spread not only by the trade publications but by traveling paper makers; it was regarded at first as a "fish-

story"—something "to see the other fellow try out" first (*infra*, pp. 32–36; 40–44). But before the year 1907 was out, it had been adopted by almost all news paper manufacturers from one end of the country to the other with great resultant increases of production, and Eibel's pitched wire had become, what it still remains, the practice of the art.

By its use the output of the average Fourdrinier machine making news paper has been increased as much as 25% or 30%, and in many cases very much more, depending upon the success with which the particular machine and the particular operator have been able to deal with other problems accompanying high speeds. Some recent machines have been built to run at speeds as high as 1000 feet per minute, *i. e.*, twice as great as anything known prior to Eibel.

DEFENDANT'S MACHINES.

The defendant operates four Fourdrinier machines at its plant at International Falls, Minnesota. Prior to the filing of the bill of complaint, all four of these machines were operating with their wires pitched downwardly from breast roll to guide roll, at a pitch of about 14 inches, which pitch is almost identical with that shown in the drawing of the Eibel patent. As a result of this pitch, these machines were turning out paper at about 600 or 625 feet per minute, that is to say, at least 100 to 125 feet per minute faster than any machine prior to Eibel had ever been able consistently to make paper.

The advantages realized by the defendant by its use of the pitched wire are strikingly set forth in a brief which its counsel filed before the Circuit Court of Appeals for the First Circuit in connection with a

motion for stay of a preliminary injunction, in which brief occurs the following statement at pages 5–6:—

> "It will be impossible for the defendant to alter over its machines within the time allowed to omit features by which it is claimed by plaintiff to infringe the Eibel patent. **Even if these machines were altered over to conform to what plaintiff asserts is open to the public, its output would be reduced to such an extent,** according to the admissions of the plaintiff itself, **that defendant would be required to install two additional machines, costing one hundred thousand dollars ($100,000) each,** and requiring months to procure and install **before it could equal its present output."**

Subsequent to the filing of the bill, the defendant reduced the pitch on the wires of one of its four machines (the No. 2) to 6 inches but continued to run all the other three at 14 inches. This reduction on the No. 2 machine was made only for the purposes of this suit and in an effort to get before the Court what may be called a "border line" case. When the Court of Appeals in this case vacated the preliminary injunction, defendant's employees, thinking the case was won, jacked up this wire again to 14 inches. Then when they found that the case was not yet finally won, they dropped it again to 6 inches (*infra*, p. 101). To this 6-inch pitch, not properly in the case at all because not used until after the filing of the bill, the opinion of the Court of Appeals in this case gives more attention than to the 14-inch pitches which were used on all four machines before the filing of the bill and which continue to be used to the present time on three of them.

THE DEFENSES.

Three principal defenses are set up by the defendant, namely: —

(1) *Prior Use.* The great bulk of the record for defendant consists of "prior use" testimony relating to about a dozen instances of alleged prior use. Upon analysis it will be found that, although some of the witnesses vaguely claim to have apprehended the Eibel principle, every one of these cases was, in fact, merely an illustration of certain trivial drainage adjustments of the prior art which are recognized and distinguished on the face of the Eibel specification and which have nothing whatever to do with the Eibel principle. It was customary prior to Eibel to raise the breast-roll slightly above the level or to depress it slightly below the level, for the purpose of regulating the *drainage* of the stock. Such adjustments never exceeded more than two or three inches, and there is no one of the prior uses in which a greater adjustment than this is proved; in fact the most that is even *claimed* by defendant to have been used is about five inches (as contrasted with the 14 inches shown in the Eibel patent and used by defendant); these adjustments were never used with any relation to the speed of the wire, and as the evidence fully proves, they were usually used under such conditions as to work absolutely opposite results from those sought and obtained by Eibel, that is to say, to increase rather than diminish commotion of the stock on the wire, so far as such trifling variations from the horizontal had any effect at all as to commotion of the stock. These adjustments, though well known, were little used and the more usual practice was to run the wires absolutely horizontal or even uphill a little.

(2) *Indefiniteness of Claims.* Certain of the claims specify the use of a "substantial" or "high" elevation for the breast roll end of the wire. The defendant urges that this terminology is indefinite, and that the claims are therefore void. As clearly appears from the specification of the patent, this term is used to denote an elevation of a different order from the trivial two or three inch drainage adjustments of the prior art; and as appears from the unanimous testimony of the fact witnesses in this case, for defendant as well as for plaintiff, no practical man has any uncertainty as to what it means. All of the witnesses agree that with less of a pitch than 5 or 6 inches no appreciable advantages can be obtained by way of speed increase on the machines, but that at pitches of about 6 inches material advantages in this direction begin to be attained. There is a sharp difference of opinion between the Circuit Court of Appeals for the First Circuit and the Circuit Court of Appeals for the Second Circuit on this defence, the Court of Appeals for the First Circuit holding that the claims are void for indefiniteness and the Court of Appeals for the Second Circuit holding that claims drawn in such terms as these are valid where, as here, "the principle of operation is made clear, . . . , a different result is accomplished, the subject-matter is incapable of exact expression in feet and inches, and the worker in the art has no difficulty in following the directions".

(3) *Non-infringement.* The defendant's whole position on this point may be summed up by saying that the defendant construes the claims as limited to a machine in which gravity due to pitch on the wire is used as the accelerating means for the stock, *to the elimination of the previously known and used factors of head and drag, or at least to the elimination of drag.* Such a construc-

tion admittedly results in the conclusion that Eibel's claims define no useful invention whatever, for no machine with a pitched wire ever has been or could possibly be operated in such a manner that drag would be eliminated. If the defendant's argument is correct on this point, then neither Eibel, the Rhinelander Paper Company, the Remington-Martin Company (defendant in the case in the Second Circuit), or any of the many licensees under the patent ever used the Eibel invention. Nor is the very machine shown in the Eibel patent, with the wire pitched as there indicated, and operated in the manner called for by the specification, any embodiment of the claims. All this is definitely admitted by the defendant's experts, and the Circuit Court of Appeals for the First Circuit expressly states that the claims, so construed, cover no useful invention; yet the Court so construes them.

Naturally we disagree with any such interpretation of the claims.

The decision of the Circuit Court of Appeals for the First Circuit, as we read it, proceeds in substance upon the ground that in view of the conceded prior art drainage adjustments, the claims are either void for indefiniteness, covering merely a difference in degree, or are so limited as to be confined to a pitch such as to eliminate drag, in which case they cover no useful invention and are also, of course, not infringed.

We shall discuss the Court of Appeals' opinion in detail in later sections of this brief.

THE DECISIONS OF THE CIRCUIT COURT OF APPEALS FOR THE SECOND CIRCUIT, AND OF JUDGE HALE AS TO THE EIBEL PATENT.

The Opinion of the Circuit Court of Appeals for the Second Circuit.

As we have seen, this patent came first before the Courts of the Second Circuit in a suit by the Eibel Process Company against the Remington-Martin Company et al., which was decided by the Circuit Court of Appeals for the Second Circuit in a unanimous decision holding the patent valid and infringed.

In this Remington-Martin case, the machines involved were in all material respects identical with those of the present defendant, substantially similar prior use testimony was presented to the Court, and the same argument of indefiniteness of claims was made.

The only difference of any consequence between the records in the two cases is that in the *Remington-Martin* case the defendant did not make the *argument* for non-infringement which defendant's expert Carter makes in this case. The *facts* in the two cases are indistinguishable.

The opinion of the Court of Appeals for the Second Circuit begins by explaining the Fourdrinier machine and the patent. The court then says (Pamphlet, p. 9; 234 Fed. 629) :—

> "The prior art showed instances where the pitch of the wire had been two or three inches and in two isolated cases up to six inches; but, as soon as the Eibel process became known, its principle was extensively adopted and applied so that today Eibel's process is the practice of the art."

(The Court later shows that in the two cases where

six inches was claimed to have been used—Raymondville and Northern Paper Company, it was merely as an *unsuccessful and abandoned experiment;* (Pamphlet, pp. 13, 14; 234 Fed. 631, 632).

The Court then remarks upon the great commercial use and success of the invention, and continues:—

> "We are satisfied from the evidence that *Eibel was the first to instruct the art in a new principle of operation.*"

After quoting the claims, the Court then considers the prior patents and prior uses, as to which its conclusions are summarized (Pamphlet, p. 12; 234 Fed. 630) as follows:—

> "(1) The prior patents. Six United States and ten foreign patents were received in evidence. All show means for effecting a slight adjustment of the breast roll and *none amounts to more than an illustration of the drainage adjustment which Eibel fully understood and referred to in his patent. The patents demonstrate that skilled men prior to Eibel did not appreciate the possibility of raising the breast roll end of the machine more than an inch or two and that none of them had the faintest conception of the principle of operation which characterizes the Eibel invention.*
>
> "(2) Prior use. We think it is clearly established that *no one of the alleged prior users had any understanding or appreciation of the Eibel principle.* The question then remains whether as matter of fact the Eibel principle was operated and whether, therefore, his contribution is merely an improvement representing an advance in degree." (Italics ours.)

The Court then analyzes the specific instances of prior

use, and shows how in most cases the supposed prior user, as soon as the Eibel patent was issued, at once adopted the Eibel pitch.

The Court then continues (Pamphlet, p. 14; 234 Fed. 632):—

> "We think the evidence establishes that no one before Eibel had any knowledge of his theory, that, where not abandoned, the slight pitches were used, in most instances, to bring stock to the dandy roll more quickly than when the horizontal wire was used, thus giving it less time to drain and causing it to reach the dandy roll in a more fluid condition; and, in any event, if there remained any doubt as to patentable novelty, that doubt would be resolved in this case in favor of the patent by commercial utility."

The Court then takes up the question of "indefiniteness of claims", saying (Pamphlet, pp. 14, 15; Fed. 632):—

> "(3) Indefiniteness of claims. It is urged that the use in Claims 1, 2 and 3 of such words as 'substantial elevation', 'high elevation' and 'rapidly' renders the claims void for indefiniteness and uncertainty.
>
> "It is apparent that Eibel's invention is not susceptible of definition in terms of inches or feet per minute. As Little testified:—
>
> " 'The exact speed for any particular pitch was something which could not be accurately determined in advance, owing to the variations in stock used, paper desired and construction of machines. Such determination is not, in fact, necessary. The grade is to be arranged to give a rapid gravity flow of the

stock, and the machines then speeded up to meet it long as the sheet remains smooth.'

"Any attempt to define lower and upper limits would have been an invitation to infringers.

"The practical workers in the art had no difficulty in understanding that the pitch must be higher than three or four inches, and that the pitch of the wire and the wire speed must be so correlated that gravity will accelerate the stock to speed equality with the wire.

"It is difficult to lay down a rule and it ; bes to confine the test of indefiniteness to the facts of a particular case. Where, as here, the principle of operation is made clear, the pitch is substantially higher than that theretofore known in the art, a different result is accomplished, the subject-matter is incapable of exact expression in feet and inches and the worker in the art has no difficulty in following the directions, then a claim using the phraseology of Claims 1, 2 and 3 will not be held invalid.

"Any other construction might readily result in depriving a meritorious invention of its commercial value."

The patent was therefore held valid and infringed.

Judge Hale's Opinion in the Present Case.

We next refer to the opinion of the District Court (Hale, J.) in the present case. This opinion shows a full appreciation of the contentions of both parties, and we think that this Court will agree to the essential soundness of its conclusions.

After stating the case, the Court considers the prior patents (Pamphlet, pp. 25, 26, 27; 267 Fed. 851, 852),

and points out that what they disclose are merely trivial drainage adjustments such as are mentioned in the Eibel specification, and that they have no suggestion of elevating the wire

> "for the Eibel purpose of reducing the relative speed of stock and wire, giving the stock a gravity acceleration, and thus doing away with the waves, ripples and wrinkles caused by the difference of speed between the stock and the wire. There is no indication that the patents seek to increase the speed of production." (Pamphlet, p. 27; 267 Fed. 852.)

The Court then considers the prior uses, and concludes (Pamphlet, p. 27; 267 Fed. 852) :—

> "After a careful study of all the evidence offered by the defendant to prove anticipation, either in patents or by a prior use, I am led to the conclusion that no one of the prior inventors, or alleged users, disclose any of the inventive purpose of Eibel. *No one shows any knowledge of any relation between the pitch of the wire and speed, or of the use of gravity to aid the other elements in well known use before Eibel.*" (Italics ours.)

And again (Pamphlet, p. 28; 267 Fed. 853) :—

> "It is evident that the trivial pitches in the prior art were used for a wholly different purpose from that of Eibel. Those who used them are not shown by the proofs to have appreciated and observed the operative system which Eibel invoked. Their use was so inconsiderable in extent that any possible effect was apparently too small to be capable of observation. They would give no help to anyone seeking to obtain further speed in the use of the

> Fourdrinier paper machine; they would give no hint in regard to any practical purpose of conforming the speed of the stock to the speed of the wire. If, in using the pitch for drainage, some slight advantage was obtained in reference to equalizing the speed of the stock to that of the wire, it was clearly an unexpected and unappreciated result."

Continuing, the Court points out that when the Eibel process was first put into use at Rhinelander, a high pitch "was looked upon as revolutionary" (Pamphlet, p. 28; 267 Fed. 853), and points out that by the use of the invention production of Fourdrinier machines has been increased 25% to 30% or more. The Court says (Pamphlet, p. 29; 267 Fed. 853) :—

> "Up to that time the usual speed of Fourdrinier machines had seldom exceeded 450 feet per minute, although the whole art was seeking greater speed. It was said that the 'fastest machines in the world' had arrived at a speed of about 500 feet per minute; but to attempt to get an increase of speed beyond this limit had met with failure; and where high speed had been tried it had been abandoned, because it was found that at higher speed there was great commotion on the wire, resulting in 'wild' paper. After the Eibel idea got fairly before the public, it was at once adopted by substantially the whole art. As a result of using the high pitch, taught by Eibel, the proofs show that the paper machines have been able to increase their speed from 25 to 30 per cent., or even more; so that it is now the common practice to make news paper at a speed of 600 feet, or even 680 feet, per minute; and that it is not now known what the limit may be to speed."

The Court next takes up the contention that the claims are void for indefiniteness, and says (Pamphlet, pp. 30, 31; 267 Fed. 854):—

> "It is apparent from the testimony of the experts that it was impossible to know in advance the exact speed which any particular pitch would cause; this lack of knowledge beforehand was due to the variations in the stock used, and to the varied use of the different elements then employed in operation; sometimes the depth of the 'pond' back of the slices would be greater than at others. The 'drag' or 'friction' of the wire on the stock might be different at different times, other elements might vary. A sufficient pitch had to be given to cause a rapid gravity flow of the stock under all existing conditions. A pitch of two or three or four inches would not be enough. It must be found by practice what pitch of the wire would be enough to bring the speed of the stock up to the speed of the wire. The claims should not be pronounced void because they do not express in inches the amount of elevation required to achieve the result which Eibel had in mind. I think the claims should not be held invalid by reason of indefiniteness."

Coming to the matter of infringement, the Court points out that the defendant contends

> "that Eibel's proposition was to give the wire such an elevation that gravity *alone*, due to the pitch of the wire, would cause the stock to attain the same speed as the wire at the point where the stock would lose its viscosity and settle down upon the wire in a thin sheet" (Pamphlet, p. 31; 267 Fed. 854)

and points out the fallacy of this view in the following passage (Pamphlet, pp. 31, 32, 33; 267 Fed. 854, 855):—

"In other words, the defendant contends that Eibel's invention contemplated that pitch *alone* should do all the work of bringing the stock from nothing up to an ultimate speed equal to that of the wire; that Eibel contemplated that there should be no 'head' at all back of the slices, and that 'drag' should be done away with altogether, as a factor in accelerating the speed of the stock; and that no machine comes within the Eibel inventive thought unless that part of the stock speed which is contributed by pitch is greater than that part of the stock speed which is due to the other two factors. The learned counsel for defendant urge that when Eibel speaks of a gravity machine, or of a 'gravity-feed', he refers to the use of gravity, to the exclusion of all other elements; and that, when, in his claims, Eibel speaks of the stock traveling by gravity, he refers to the use of gravity without any help from other sources. It is to be noted that Eibel's one object was to arrange a process by which the machine could be run at a much higher speed than heretofore. With this in view, Eibel organized his machines at the Rhinelander Paper Company in such a way that they had a pitch of about fourteen inches and run at a speed between 500 and 600 feet per minute. To produce this result he used gravity. He used, also, the elements which he found at hand; namely, the 'drag' and the 'head', due to the depth of the 'pond' back of the 'slice'. His effort was to get speed; he did not wish to abolish or disregard any of the elements which helped him to get speed.

"But, if the contention of the defendant is correct, he did not put his own invention into practical use at Rhinelander, or at any other place, for in practice

he did not obtain his speed by gravity alone. In fact, the defendant's experts testify that the mode of operation set forth in the Eibel patent in suit has never been put in practical use by anybody: it was not used at Rhinelander; it was not used in the other mills; it is not embodied in the drawings of the patent.

"I cannot sustain such contention. I cannot so construe the specification and claims of the patent. Eibel introduced a new speed-making factor. He proposed to bring the speed of the stock up to the speed of the wire, to use gravity to that end; but I cannot hold that he contemplated that gravity should be used to the exclusion of the other elements which were already in use. He found those elements at work; there is no reason why he should exclude them from helping along the work. The process invented by him begins to operate after the stock has entered upon the wire. His apparent attempt was to get rid of bubbles and wrinkles, before he got to the place on the machine where paper is formed. To do this, he allowed gravity to work with 'drag' and with 'head'. He harnessed all the elements he could find. He brought gravity in with the other elements; and so brought the speed of the stock up to equality with that of the wire. By this means he achieved high speed and also freed the stock on the wire from waves and ripples.

"The proofs show that the defendant has used a substantial pitch, and not merely the trivial pitch employed for drainage adjustments; and that it has used this pitch in order to call gravity into operation, as an accelerating factor, to speed the stock up to a speed equal to that of the wire. I think it must

be held that the defendant infringes the principles of the Eibel patent."

We believe that the conclusions of the District Court on the matter of the construction of the claims and infringement, so clearly stated in the passage above set forth, will certainly be approved by this Court, rather than the construction contended for by the defendant and adopted by the Circuit Court of Appeals for the First Circuit, which drove that Court to the conclusion that the claims define "no useful invention".

CHAPTER II.

THE EIBEL INVENTION CONSIDERED IN DETAIL: ITS RECEPTION BY THE INDUSTRY, AND ITS UTILITY.

The Fourdrinier Machine.

The following brief description of the Fourdrinier machine will be sufficient to make clear the nature of the machine to which Eibel's invention relates.

The Fourdriner machine is one of the best known forms of paper-making machine, and is universally used for making news paper. It consists essentially of a moving endless wire sieve, or *"wire"*, of fine mesh, the wire being 100 or more inches wide, and traveling over rollers for a working distance of 30 feet more or less, at a constant speed. On the top of the wire at the beginning of its course there is discharged a stream of paper-making stock consisting of wood pulp or other fibres and water, the stream having a thickness of, say, a half inch to an inch, and extending across the full width of the wire. As the stock travels along with the wire, the water drains from it through the wire, its removal being aided by suction applied through "suction boxes" contacting with the under side of the wire during a portion of its course, and the fibres felt themselves into a moist web or sheet which at the farther end of the wire's upper course is stripped from the wire and is passed through a series of presses, driers and calenders, to be discharged at the "dry end" of the machine as finished paper.

In the record will be found numerous terms relating to the Fourdrinier machine which require definition. The *"flow-box"* is the box in which the *"stock"* is stored up

and from which it is discharged upon the moving wire. The *"slice"* is the horizontal gate extending across the wire, by raising which the stock is discharged from the *"pond"* of stock in the flow-box, passing under the slice, and out on to the wire in a stream having the width of the desired sheet of paper and having a thickness dependent upon the height of the slice opening and having a speed determined by the hydraulic *"head"* due to the depth of the pond of stock back of the slice. The *"deckle straps"* are endless rubber bands of rectangular section which rest upon the wire at each side of the stream of pulp and travel with the wire so as to form lateral walls to confine the stream of stock, until it has reached a condition of dryness such that it no longer tends to flow. The "table-rolls" are a series of parallel horizontal rollers between the *"breast-roll"* and the *"couch-roll"* upon which the active portion of the wire is supported so as to present a plane surface. The *"dandy-roll"* is a roller faced with wire cloth which is placed above the wire at a point beyond the first suction-box and in contact with the upper surface of the paper, which imparts to the upper surface of the paper a texture similar to that which the lower surface receives from its contact with the paper-making wire. The dandy-roll also may carry the design which impresses the "water mark" on the sheet in cases where a water mark is desired. The last roller for supporting the wire is larger than the others and is called the *"guide roll"*, since it is equipped with a device for automatically varying the position of its axis so as to keep the wire running straight. After the wire passes over the guide-roll, it drops at an angle below the horizontal to the "couch-roll". The *"shake"* is a mechanism for shaking the front end of the machine sidewise to promote interlocking of the fibres.

Eibel's Specification and Drawings.

Referring to Fig. 1 of the Eibel patent (Rec. p. 1011), the endless Fourdrinier wire is shown at *a* running over the breast-roll *b*, then over the numerous table-rolls, unlettered, over the suction-boxes *d*, *d*, *d*, and over the guide-roll *e*, to the lower couch-roll *c*, and thence back underneath the machine. The dandy-roll, unlettered, is seen resting on the wire just in front of the second suction-box *d*. Resting upon the lower couch-roll is the upper couch-roll, unlettered. The flow-box is not shown, but would be at the right of the drawing, so that the stock would flow from it upon the wire just above the breast-roll *b*. The drawing shows the wire *a* downwardly pitched at an inclination of about four per cent, or something like *12 or 13 inches* of elevation at the breast-roll for a wire of usual length (Rec. p. 23).

The specification starts with the statement, p. 1, lines 10–15, that the invention has for its object "to construct and arrange the machine *whereby it may be run at a very much higher speed than heretofore* and produce a more uniform sheet of paper which is strong, even and well formed".

He continues (p. 1, lines 16–41):—

> "My invention is embodied, essentially, in the first part or element of the machine having the Fourdriner wire or paper-making wire, and consists in causing the stock to travel *by gravity* in the direction of movement of the making-wire and approximately as fast as the making-wire moves, thereby resulting in a 'gravity-feed' for the machine. The stock may be and preferably is caused to travel more rapidly than the normal or usual speed of the making-wire for a certain grade of stock, and means

are provided for increasing the speed of the machine so as to cause the making-wire to move at a higher rate of speed than usual, being substantially equal to the speed of the rapidly-moving stock. To accomplish this result in a simple manner, the breast-roll end of the paper-making wire is maintained at a substantial elevation above the level, thereby providing a continuous downwardly-moving paper-making wire, and *the declination thus given to the wire is such that the stock is caused to travel by gravity in the direction of the movement of the wire and substantially as fast as the wire moves.*"

At page 1, lines 80 et seq., Eibel states the prior art as follows:—

"The Fourdrinier wire has usually been arranged to move in a horizontal plane, although I am aware that means have been provided for adjusting the breast-roll end of the wire to different elevations, usually below the level, to provide for running with different grades of stock—as, for instance, with quick stock and slow stock *; but so far as I am aware *the making-wire has always had to perform the work of drawing along the stock,* and as the wire moved much faster than the stock the stock waved or rippled badly near the breast roll end of the wire, which gradually diminished until an equilibrium was established and a smooth, even and glassy surface presented, and not until the waving or rippling ceased did the fibers lay down uniformly and pro-

* "Quick" stock is stock which drains quickly, *i. e.,* stock in which, because of the character of the fibres or otherwise, the water is easily and quickly drained from the fibres; "slow" stock is stock which drains slowly.

> duce a well-formed sheet of paper. The machine has been run necessarily at a slow rate of speed to give ample time for the water to escape and for the fibers to lay down so as to make a uniform sheet, and in case the time was insufficient the breast-roll end of the wire has been lowered still farther until the desired result was accomplished. *In accordance with my invention I operate entirely above the level to cause the stock to travel by gravity at a velocity approximately equal to the speed of the making-wire, which I believe to be a new principle of operation.*"

In this passage, Eibel thus refers to certain prior art adjustments used for the purpose of regulating drainage of the stock, these adjustments having been of only minute extent (usually a couple of inches or so) and either uphill or downhill, according to the water retentiveness of the grade of stock used from time to time. He proceeds to discriminate his invention therefrom not only because of his new *principle of operation*, not employed at all in connection with such drainage adjustments, but also because his invention requires the use of a substantial pitch or elevation as distinguished from these trifling drainage adjustments, the extent of which even if in a downward direction would be inadequate to accomplish any useful result so far as Eibel's purpose was concerned.

At page 2, lines 28 to 33, Eibel says:—

> "The elevation above the level at which the breast-roll end of the making-wire is maintained will vary according to the grade of stock; but in any event it will be substantial, so as to cause the stock to move rapidly by gravity."

And at page 2, lines 39 to 58:—

> "For the purpose of increasing the speed of the machine to the maximum I maintain the breast-roll end of the making-wire at a high elevation above the level, so that the stock travels by gravity much faster than the making-wire ordinarily runs for a certain grade of stock, and I then increase the speed of the machine to such extent as to bring the rate of speed of the making-wire up to the speed of the rapidly-moving stock, and as a result the capacity of the machine is largely increased.
>
> "I find in practice that by providing a gravity-feed operating substantially as herein described the stock runs smoothly and evenly without waving or rippling, and the fibers are thereby permitted to settle with great uniformity as regards their distribution over the wire, so that the paper in addition to being well formed is very uniform."

A person who has not seen the Eibel invention in practice might wonder how speed equality between stock and wire is possible with a downwardly pitched wire since gravity is an accelerating force and the wire has a uniform speed. In point of fact, with a pitched Eibel wire and a correspondingly adjusted wire speed, *after the stock once reaches the speed of the wire, under the influence of gravity, it does not overrun the wire, but continues thereafter at the wire speed.* The reason for this is that the friction between wire and stock near the beginning is very slight because of the high fluidity of the stock, and the drag of the wire in these early stages has little accelerating effect upon the stock, but, as the water drains out, leaving the stock more and more pulpy and viscous, the friction between wire and stock becomes

greater and greater, until *by the time equality of speed has been reached between wire and stock the drag of the wire has become the controlling influence, and friction is so great as to prevent any further increase of speed of stock.* Up to the time when equality of speed is reached, the friction effect, so far as it operates at all, aids gravity in causing acceleration. Thereafter it opposes and overcomes the accelerating influence of gravity (Rec. p. 27).

Eibel of course recognized that gravity will not give the stock a uniform velocity over the whole length of the wire, but that at some point on the wire a maximum stock speed will be reached, and he directs the reader of his specification so to adjust his wire speed that the stock will not, at its maximum speed, under the influence of gravity, outrun the wire, saying that the speed of the making wire is to be brought up to this "*maximum velocity* of the rapidly moving stock" (p. 1, lines 50–52).

There is always some commotion at the beginning of the wire, even when the stock enters upon the wire at substantially the wire speed. Many factors prevent an instantaneous quiescence of the sheet at the start, among these being the irregularities caused by the rush of the stock from under the slice, the variations between the speeds of the top and bottom of the sheet of stock, the effect of the shake, which is greatest near the breast-roll, and the effect of the drainage through the wire, which is also greatest near the breast-roll. But, as we have pointed out, the commotion of the stock for the first few feet down the wire is of no consequence, since the stock at that point is in a highly fluid condition, and when Eibel says that with his process "the waves or ripples are eliminated" and that the "stock runs smoothly and evenly without waving or rippling", he means that

all commotion on the wire is eliminated from that part of the wire where the stock is "felting down" and the paper is forming actively. This only is important.

The Claims in Issue.

The claims in issue here are the same as in the Remington-Martin case, namely, Nos. 1, 2, 3, 7, 8 and 12. They read as follows:—

"1. A Fourdrinier machine having the breast-roll end of the paper-making wire maintained at a substantial elevation above the level, whereby the stock is caused to travel by gravity, rapidly, in the direction of movement of the wire, and at a speed approximately equal to the speed of the wire, substantially as described.

"2. A Fourdrinier machine having the breast-roll end of the paper-making wire maintained at a high elevation, whereby the stock is caused to travel by gravity faster than the normal speed of the wire for a certain grade of stock, and having means for increasing the speed of the machine to cause the wire to travel at substantially the same rate of speed as the rapidly moving stock, substantially as described.

"3. A Fourdrinier machine having the paper-making wire declined from the breast-roll to the guide-roll, the breast-roll end of the wire being maintained at a substantial elevation above the level, whereby the stock is caused to travel by gravity, rapidly, in the direction of movement of the wire and at a speed approximately equal to the speed of the wire, substantially as described."

"7. A Fourdrinier machine having the paper-making wire declined from the breast-roll to the guide-

roll, and the suction-boxes supported at a corresponding declination, substantially as described.

"8. A Fourdrinier machine having the paper-making wire declined from the breast-roll to the guide-roll, and the several suction-boxes arranged at different elevations, substantially as described."

"12. In a Fourdrinier machine, a downwardly-moving paper-making wire, the declination and speed of which are so regulated that the velocity of the stock down the declining wire, caused by gravity, is so related to the velocity of the wire in the same direction, that waves and ripples on the stock are substantially avoided and the fibres deposited with substantial uniformity on the wire, substantially as described."

EIBEL'S HIGH PITCH WHEN FIRST ANNOUNCED WAS LOOKED UPON BY THE ART AS REVOLUTIONARY IN ITS NOVELTY.

Defendant suggests and the Circuit Court of Appeals for the First Circuit seems to agree, that, in view of the previous use in the art of adjustments of breast rolls two or three inches above (or below) the level, Eibel's idea of a high pitch for increasing the speed was obvious. Not only does the actual history of the art recited below thoroughly disprove this contention, but the express testimony of many of the defendant's own witnesses shows that the workers in the art, familiar as they were with the drainage adjustments, looked upon Eibel's idea when it was first suggested by Eibel as novel to the point of being revolutionary—as something to be tried "gingerly".

Judge Hale says (Pamphlet, p. 28; 267 Fed. 853):—

"The proofs show that, when the Eibel process

was first put in use at Rhinelander, the high pitch which Eibel had brought to the art was looked upon as revolutionary."

This finding is compelled by the testimony of *defendant's own witnesses,* to which we shall now refer.

Defendant's witness Ross, treasurer of the Beloit Iron Works, paper machine builders who built the machines upon which Eibel worked out his invention at Rhinelander, took one of his customers to Rhinelander to see the Eibel pitch in operation. His testimony as to why he took this man to Rhinelander is highly interesting:

Rec., p. 372:

"*X-Q.* 323. Why did you take him up—I mean why was it desirable to take him up there?

A. Well, **he doubted my word when I told him the story; he thought it was a fish story."**

Rec., p. 373:

"*X-Q.* 333. What was there about that thing that Mr. Oberley doubted your word and thought you were telling him a fish story?

A. Why he was a machine-tender and learned his trade in a paper mill, *and had never seen a machine that had that amount of pitch, and so doubted my statement.*

X-Q. 334. He doubted the statement that that amount of pitch could be carried, or that you could run at that speed?

A. He doubted the pitch.

X-Q. 335. **Well, was it a striking thing?**

A. **Oh, yes."**

Rec., p. 374:

"*X-Q.* 356. Well, this Eibel idea spread pretty rapidly, didn't it?

A. It spread; I don't know how rapidly."

Rec., p. 375:

"*X-Q.* 360. It came in pretty rapidly, didn't it?

A. I don't know rapidly, no, because **there were many doubters.**

X-Q. 361. What did they doubt; what was the reason for their doubting?

A. **A new thing; they wanted to see the other fellow try it out.**

X-Q. 362. Well, why did they need to see somebody else try it out; wasn't the desirability obvious?

A. Well, Oberley didn't think so, until he went over and saw it. Some others were the same way, **they had to see it and watch it, before they would adopt it.**

X-Q. 363. Why should anyone have doubts about it?

A. **Just because it is a new thing.**"

"*X-Q.* 369. Well, you talked with him about the Eibel success, didn't you?

A. Yes, I believe I did.

X-Q. 370. And isn't there every reason to suppose that it was because of Eibel that he wanted that pitch put in his machine?

A. It might be."

Rec., p. 376:

"*X-Q.* 375. Isn't it a fact that the Beloit Company were proud of those Rhinelander machines, the work they were doing with Eibel's pitch?

A. Naturally.

X-Q. 376. You were proud they could get as much speed as they were?

A. Yes, sir.

X-Q. 377. **Proud that on them this new idea had been worked out?**

A. **Yes, sir.**

X-Q. 378. And didn't you send customers of yours up there to see the Eibel machines?

A. We referred them to that mill."

Rec., p. 428:

"*X-Q.* 106. Do you consider it to the interest of the Beloit Co. to have the Eibel patent declared invalid?

A. No. I do not know as we do consider it that way. I have been frank to tell some of the paper makers that I did not know whether it was Alpine or Eibel that was entitled to the credit for this,* but that **some one ought to have a little pay on the side for having nerve enough to try it."**

Defendant's witness Bailey, who was at one time employed to aid in installing the Eibel invention at various mills, testifying as to his work for the owners of the Eibel patent in the year immediately following the issue of the patent, said (Rec., p. 537, Q. 247):—

"But *the idea was new.* . . .

And he testified as to his experience in introducing the pitch at the Berlin Mills as follows (Rec., p. 543, X-Q. 357):—

"*A.* I believe it was in January, 1906, I went to,

* Defendant originally contended that one Alpine instead of Eibel was the originator of the idea, but that contention has now been abandoned. (See statement by defendant's counsel at Rec., p. 164.)

or January, 1907, I went to the Cascade mill in Berlin, New Hampshire, and put blocking under,—well, first I was supposed to put it under two at the Cascade, that is the big machine, and it is 164. After Billy Corbin, the manager, found out what it was and he says: '*Jack, I don't want to take the chances until we try it out on the little one.*' Why, he was manager over the two mills and first we tried it on that 96 inch machine in the old Berlin mill one Sunday. The next Sunday we put it under No. 2 in the Cascade."

"Billy Corbin" was not the only one who did not care to take chances with this pitch until he saw it tried out somewhere else where it would do no harm if it did not work. Thus defendant's witness Bowman, a paper mill superintendent and one of the alleged "prior users" who, like the others, adopted the high pitch on his machines as soon as Eibel had showed how, testified that though he knew that the St. Croix mills (an Eibel installation) was using 21 inches of pitch, he did not dare to put his machines up even so high as 10 inches all at once, but tried 6 inches first.

Rec., p. 483:

"*X-Q.* 160. What mill at Berlin, Mass., were they speaking about?

A. Berlin Mills Company, Gorham; there was the St. Croix that was up to 21, and if they could go up 21, I could go to 10.

X-Q. 161. You tried 6 first?

A. Yes."

"That way I got it by stages", he says (X-Q. 154), and again he says (Rec., p. 486, X-Q. 214):—

"All the years I have been in business that was the first start of raising wires, **I went at it gingerly."**

Defendant's witness Ross says (Rec., p. 392, X-Q. 559) that though he was familiar with the slight pitches of an inch or so, "I didn't call that any pitch", but *"when it got to 5 or 6 inches that made us shake our heads"*, and:

"X-Q. 560. That was a different thing?
A. Yes, sir."

(See also much more testimony to similar effect collected below at pp. 40–44.)

In the face of such testimony as this, by defendant's own witnesses who saw the Eibel pitch introduced, who were familiar with the drainage adjustments and the "prior uses" that defendant now relies upon as disproving the novelty of Eibel's pitch, we submit that the arguments of counsel and experts for defendant that what Eibel did was obvious, are shown to be without foundation.

The Court of Appeals for the First Circuit substitutes for this evidence as to how the actual workers in the art actually regarded the Eibel pitch when they first heard of it, the Court's own theory that it *ought to have been and must have been obvious to them.*

THE NOVELTY OF EIBEL'S IDEA PROVED BY ITS INSTANT ADOPTION BY THE ART WHEN ONCE DISCLOSED BY EIBEL.

News Manufacturers were Straining Every Nerve to Get More Speed.

The Court of Appeals for the Second Circuit in the Remington- Martin case said (Pamphlet, p. 5; 234 Fed. 627) that

> "in order to earn a proper return upon this heavy investment [in the Fourdrinier machines] the paper maker is forced to utilize to the utmost the productive capacity of the machine. The machines are constantly operated day and night, and every endeavor is made to run them at the highest speed consistent with the quality of merchantable paper. . . ."

The evidence in the present case makes this just as clear as it was in the Remington-Martin case.

The Court of Appeals for the First Circuit in its opinion in the present case says (Pamphlet, p. 36; 274 Fed. 541):

> "Speed—which means quantity—and quality of paper, have been for decades the constant quest of paper-makers."

Since there is no dispute on this point, there is no necessity of quoting passages from the record in support of it. Such passages, stating the facts in most emphatic terms, will however be found at p. 294, X-Q. 602; p. 301, X-Q. 94; p. 241, X-Q. 146; p. 343, X-Q. 269; p. 374, X-Q. 345; p. 482, X-Q. 147; p. 740, X-Q. 259–261; p. 725, X-Q. 82.

It may be taken for granted, then, that any improve-

ment in news machines which would have increased output without additional expense would, if anyone in the art had conceived the possibility of using it, have been put into use just as soon as it was discovered.

The Regular Practice Was to Run the Wires Level or Even Uphill.

As a matter of fact, in spite of the presence in some of the machines of the art of the adjustments for drainage, the regular practice of the art at the date of Eibel's invention was to run with the wires level, or even uphill. We quote *defendant's witnesses:*

Thom, superintendent of the Kimberly-Clark paper mills, Rec., p. 341:

> "*X-Q.* 236. The general practice was to run the machines with the wires flat?
>
> *A.* Yes, or below, if the paper required it."

Ludwig, an experienced machine tender, Rec., p. 300, X-Q. 82:

> "*A.* Oh, they all had screws to adjust them, but I never really seen anybody monkeying around with them.
>
> *X-Q.* 83. They generally ran flat?
>
> *A.* Some of them they had down below."

Bowman, formerly superintendent of a paper mill at Niagara Falls, Rec., p. 475:

> "*Q.* 25. What had been the general practice in operating these machines, had they been operated on the level or below the level?
>
> *A.* Below the level, any machine."

Plaintiff's witness *Talbot,* superintendent of the St.

Croix Paper Company, testifies (Rec., p. 115) that although he had been working on paper machines in half a dozen different mills all over the country since 1890 he had never, until the Eibel pitch came out, seen any wires running with any downward pitch at all, and that the regular practice on all the machines he ever worked on was to run level (Qs. 38, 39).

Defendant's witness *White*, of the Moore & White Co., machine builders, testified that these breast-roll drainage adjustments frequently got corroded and clogged up so that they could not be worked and were abandoned (Rec., p. 606, Qs. 123–127).

When Eibel Showed How, Every One Instantly Adopted The Eibel Pitch.

Eibel made his invention while superintendent of the Rhinelander Paper Mills at Rhinelander, Wis., and put it into operation on the two machines there in 1906 by blocking up the breast-roll ends of the machines, thereby being enabled to increase the speed of the machines from 420 feet per minute to 550 or 575 feet (Bailey, Rec., p. 535, Qs. 199-203; p. 542, X-Qs. 339–351; p. 544, X-Q. 370).

The moment that Eibel's invention became known and his use of it at the Rhinelander Paper Mills was proved successful, the high pitch "spread like wild-fire" throughout the country, and from that same year—the year 1907—dates the practically universal adoption of the high pitch on news machines throughout the country; and it is definitely admitted by all the practical witnesses that this was the direct and immediate result of Eibel's work.

We quote passages from *defendant's witnesses* in proof of these statements:

Ross, treasurer of the Beloit Iron Works, paper machine builders, Rec, p. 374:

"*X-Q.* 347. Well, isn't it a fact, just taking the bare facts, and regardless of reasons for a minute, isn't it a fact that, as soon as Eibel had put in this higher pitch at Rhinelander, a great many news machines did adopt it at once?

A. Yes, sir."

Rec., p. 376:

"*X-Q.*375. Isn't it a fact that the Beloit Company [Ross' company, which built the Rhinelander machines] were proud of those Rhinelander machines, the work they were doing with Eibel's pitch?

A. Naturally.

X-Q. 376. You were proud they could get as much speed as they were?

A. Yes, sir.

X-Q. 377. *Proud that on them this new idea had been worked out?*

A. Yes, sir."

"*X-Q.* 379. And didn't you send customers of yours up there to see the Eibel Machines?

A. We referred them to that mill."

Rec., p. 395 X-Q. 595:

"*A. It has been the tendency to elevate their breast-roll since this Eibel experiment came out.*"

Davis, of J. H. Horne & Sons Company, paper machine builders, Rec., p. 870:

"*X-Q.* 266. Well, it was about that time, presumably, that you heard that Eibel had given a high pitch to his wires at the Rhinelander Paper Company?

A. I presume so.

X-Q. 267. And that was generally reported around in the business, was it?

A. Oh, yes. I suppose, **like all new things, it goes like wildfire when it once gets started."**

Rec., p. 878:

"*X-Q.* 366. What is your theory as to the reason why the St. Croix people [in 1907] wanted or might have wanted to put blocking under those machines?

A. I can only answer that by saying that *everybody was doing it* and I suppose they followed the crowd."

Argy, superintendent of Cliff Paper Mills, Rec., pp. 444, 445:

"*X-Q.* 237. Do you remember when you first heard about Eibel and his patent?

A. No, I don't; it was along in 1907—along in there to best of my recollection.

X-Q. 238. How did you happen to hear of it?

A. Why, at Niagara Falls we are sort of central between the east and west and paper makers are traveling through there all the time and we get all that is going on, rumors and gossip, there is nothing that goes on in the paper mill game that you don't get at Niagara Falls pretty quick.

X-Q. 239. These items of interest travel pretty fast?

A. Pretty fast, sure.

X-Q. 240. Well, the *information was brought by some paper makers?*

A. Yes."

"*X-Q.* 242. Made quite a sensation at that time,

didn't it, Eibel's success with the Rhinelander machine?

A. I don't remember hearing anything about Eibel's success with regard to the Palmer's mills; I did hear where they had elevated they had better success.

X-Q. 243. Elevated at Rhinelander?

A. I heard it originated there."

Hazel, superintendent of St. Regis Paper Co., Rec. p. 512:

"*X-Q.* 331. How did you hear about Eibel, by the machine tenders that report those things around?

A. Why, yes, practically. I did not read out of any book; **just listening to traveling paper makers talking about it.**

X-Q. 332. *It was generally talked in the trade about that time?*

A. Why, yes."

Beyerl, defendant's engineer, Rec., p. 289:

"*X-Q.* 530. When did you first hear about the Eibel patent, do you remember?

A. About—some years ago; if I recollect, it was somewhere around 1907 or 1908.

X-Q. 531. How did you happen to hear about it?

A. It was published.

X-Q. 532. Published in what?

A. In the Paper Trade Journal; I believe that is the first time I noticed it.

X-Q. 533. I notice in an affidavit that you made in this case that you implied that ten years ago the practice began of raising the wires to a higher pitch in the news mills; is that right?

A. About ten years ago [*i. e.,* in 1907]; somewhere

along there; about ten years ago when I first heard it went up to a very high pitch."

Rec., p. 290:

"*X-Q.* 539. But you do know that about 1907 a good many news machines were given these high pitches?

A. I know during that time there was a *great deal of talk about it.*"

Kinney, of the Bagley & Sewall Co., paper machine builders, Rec., p. 582:

"*X-Q.* 427. The high pitch came in 1907?

A. Yes, sir."

"*X-Q.* 435. How did you happen to hear about it?

A. Just in mills. We go from mill to mill and we talked about *this Rhinelander scheme* of raising the wire, and it soon became general knowledge.

X-Q. 436. Do such things travel pretty fast in the trade?

A. Very fast, indeed.

X-Q. 437. Well, that excited a good deal of comment at that time, did it not?

A. Yes, sir.

X-Q. 438. *And mills generally immediately began to fix their wires in accordance with the Rhinelander scheme generally throughout the country,* so far as you are acquainted with it?

Mr. PAUL. That calls for your personal knowledge.

A. Well, it is so in news mills."

Smith, of the Oglesby Paper Co., Rec., p. 854:

"*X-Q.* 323. It is a fact, isn't it, that as soon as

Eibel had demonstrated that you could use a high pitch on a Fourdrinier machine, that the high pitches were adopted pretty universally by news machines in the country?

A. I heard that they were, yes."

Lansing, president of the Bagley & Sewall Co., paper machine builders, Rec., p. 661, answer to XQ. 122:

> "Well, whenever,—*if you have the date of when these mills generally jacked their machines up why that is probably the time I heard the name of Eibel.*"

As specific instances of this universal adoption of the Eibel idea in 1907, to which the foregoing witnesses testify in general terms, we shall see below (pp. 50–55) that in **the case of every one of the eight machines as to which defendant took testimony in this case in the effort to prove speeds higher than 450 feet prior to Eibel, it was brought out in the testimony that in the year 1907, directly as a result of the fame of Eibel's invention, high pitches were adopted and great increases of speed obtained thereby.** We show in the discussion of the prior uses in the appendix to this brief that many of the so-called prior users did the same thing.

If, as defendant argues, the use of the Eibel high pitch was a logical evolution of the previous trivial drainage adjustments, why is it that no one used it until Eibel showed how, and how is it that, as soon as he did show how, the whole art jumped at it? *There is no possible explanation of this history consistent with defendant's theory that the Eibel pitch did not involve invention.*

The Court of Appeals for the First Circuit takes no notice whatever of the significance of all this evidence.

UNIVERSAL USE OF THE EIBEL INVENTION BY LICENSEES AND INFRINGERS.

At the time of Mr. Aldrich's testimony in this case, the total daily production of news paper by machines licensed under the Eibel patent in the United States was *3400 tons a day.* This is about two-thirds of all the news paper manufactured in the country (Aldrich, p. 35, Q. 7). The licensees under the patent include the largest news paper mills in the country. The list is given at p. 36, Q. 7, as follows:—

Great Northern Paper Company of Millinocket, East Millinocket and Madison, Maine.

International Paper Company of New York (which has many mills at different points).

St. Croix Paper Company of Woodland, Maine.

Berlin Mills Company of Berlin and Gorham, New Hampshire.

Finch, Pruyn & Company, Inc., of Glens Falls, New York.

Laurentide Paper Company of Grand Mere, Quebec.

West End Paper Company of Carthage, New York.

Oswego Pulp & Paper Company of Fulton, New York.

Remington Paper & Power Company (successor of Remington-Martin Company), Norfolk, Norwood and Raymondville, New York.

St. Regis Paper Company of Deferiet, New York.

Gould Paper Company of Lyons Falls, New York.

DeGrasse Paper Company of Pyrites, New York.

Diana Paper Company of Harrisville, New York.

Crown-Willamette Pulp & Paper Company of Oregon City, Oregon, and Camas, Washington.

Tidewater Paper Mills Company of Brooklyn, New York.

Most of the remaining one-third of the country's production of news paper is made on machines operating in infringement of the Eibel patent, as is indicated by the list of concerns who are contributing to the defence of this case. These number among them most of the news mills in the country which are not licensed under the Eibel patent and include the Northwest Paper Company, Consolidated Paper Company, Marathon Paper Company, Donaconna Paper Company, J. R. Booth, Tomahawk Pulp & Paper Company, Dells Paper & Pulp Company, Hennepin Paper Company, Grandfather Falls Company, Lake Superior Paper Company, Watab Pulp & Paper Company, and the defendant, the Minnesota & Ontario Paper Company. (See stipulated testimony of Webber, p. 165, and Aldrich, p. 36.)

Indeed defendant's own witnesses say that the use of the pitched wire is now practically universal on news machines.

We quote what some of *defendant's witnesses* have to say on this point:

Ludwig, a machine tender for the Hennepin Paper Co., (p. 300):—

> "*X-Q.* 88. Pitched wires—is it pretty universal to use pitched wires in news machines now?
>
> *A.* Do you mean use them all around?
>
> *X-Q.* 89. Yes.
>
> *A.* I think so."

Hazel, superintendent of the St. Regis Paper Co., (p. 516):—

> "*X-Q.* 393. Is the high pitch practice universal now in news?
>
> *A.* I understand that it is.
>
> *X-Q.* 294. What do you mean by high pitch?

A. Oh, twelve, fourteen and sixteen inches.

X-Q. 395. It is generally supposed you can get a good deal more speed out of the machine if you have that pitch than if you do not?

A. That is the general belief."

Argy, another paper mill superintendent, (pp. 451, 452):

"*X-Q.* 335. Are you familiar with the condition of news machines throughout the country?

A. Fairly so.

X-Q. 336. The pitch is universally used on them now, is it not?

A. All that I know of.

X-Q. 337. All have high pitches?

A. More or less."

Defendant's witness Lansing, president of the Bagley & Sewell Company, large manufacturers of paper machines, says that he *does not recall a single news machine made by his company since 1907 (the date when Eibel's patent came out) which has not had a pitch of at least 8 inches* (p. 663, X-Qs. 145, 146). To similar effect see White, p. 624, X-Q. 344.

How, in all fairness, is it possible to say, in view of such facts as these that our claims as to the commercial success of Eibel, are "very much exaggerated" merely because it appears that five of the licensees under the patent are also stockholders in the plaintiff company? Yet this is what the Court of Appeals for the First Circuit sets up, as the reason why *"no very great weight can be attached to the extent of the commercial use attained"* (Pamphlet, p. 58; 274 Fed. 553, 554).

PRODUCTION INCREASES BROUGHT ABOUT BY THE USE OF EIBEL'S INVENTION.

The Court of Appeals in the Remington-Martin case said (Pamphlet, p. 9; 234 Fed. 629) that news machines, by using the Eibel invention,

> "have been speeded up *from an average of 400 to 450 feet per minute up to over 680 feet per minute;* and that speed may at any time be exceeded, for the only limits which remain are certain practical factors such as strength of machine parts, drying capacity, and ability of the workmen in handling the paper." (Italics ours.)

The testimony in the present case fully bears out this statement, both as to present day speeds and as to speeds prior to Eibel, and Judge Hale so finds on this record in the passage from his opinion which we have quoted above, p. 18.

Since the Court of Appeals for the First Circuit in this case says (Pamphlet, p. 58; 274 Fed. 554) that our contention that Eibel's invention has increased the average speed of Fourdrinier machines 25 per cent to 30 per cent "is not borne out on fair analysis of the whole record" although "some part of that increase is due to the adoption of increased pitch, and Eibel's disclosure of the advantages of increased pitches has had some practical and beneficial effect in the art of paper making", we ask the Court's careful attention to the evidence on this point, which will, we think, fully support Judge Hale's finding and that of the court of Appeals for the Second Circuit in the Remington-Martin case rather than that of the Court of Appeals for the First Circuit.

As to speeds in use prior to Eibel, defendant went to

great pains in an effort to prove that the statements of Mr. Aldrich and of the Court of Appeals in the Remington-Martin case (quoted above), that the average speeds of news machines prior to Eibel did not exceed 450 feet a minute, are erroneous. To this end it put on the stand representatives of four of the largest concerns making paper machines in the country, namely: Bagley & Sewall Company, Pusey & Jones Company, Moore & White Company and J. H. Horne & Sons Company. The net result of the testimony was not only to show, out of the mouths of defendant's own witnesses, that 450 feet was a *high estimate* for the average speed of news machines prior to Eibel, but to prove further that *all efforts prior to Eibel to exceed speeds of about 500 feet, even on the most modern machines, had resulted in failure, and that while some few machines had been run temporarily at speeds above 500 feet, in each such case it had been found that such speeds could not be maintained and marketable paper produced, and on each such machine the speed had been reduced to 500 feet or less at the time Eibel's patent came out.*

It further appears that, with complete unanimity, every one of the machines mentioned by defendant in this connection was given a high pitch in the year 1907, immediately following and as a direct result of Eibel's success at Rhinelander; that as a result of using this pitch, all these machines made speed increases varying from 15 to 40 per cent or more, and that in every case the owners of the machine took a license under the Eibel patent.

The specific instances referred to by defendant's witnesses where speeds higher than 450 feet a minute are alleged to have been attained prior to Eibel include the following (which are the only ones given any prominence

in the testimony or as to which there is any evidence worthy the name) :—

1. A Pusey & Jones machine at the St. Croix Paper Company.

2. Two Bagley & Sewall machines at the Remington-Martin Company.

3. Four Bagley & Sewall machines at the Berlin Mills.

4. A Bagley & Sewall machine at the Laurentide Paper Company.

5. A Pusey & Jones machine at Palmer Falls, N. Y.

6. Certain Pusey & Jones machines ("Defender" type) of which a machine at Willamette Pulp & Paper Company was a specimen.

7. Certain Bagley & Sewall machines at St. Regis Paper Company.

8. A Bagley & Sewall machine at Raymondville Paper Company.

The Bagley & Sewall machines are for the most part referred to in a catalogue of the Bagley & Sewall Company of 1905 (Dfts. Ex. T-2) and are mentioned by defendant's witnesses Kinney and Lansing from that company; the Pusey & Jones machines are referred to by defendant's witness Davis.

In Appendix B to this brief (*infra*, p. 232) we have analyzed the testimony regarding these machines at length, and we shall here only briefly summarize, referring the Court to the appendix for details and references to the testimony, which will be found in every instance to support fully the statements here made:

1. *The Pusey & Jones machine at the St. Croix Paper Company.* (Appendix, p. 232.) This was installed in the latter part of 1906, and was "supposed to be the *fastest machine in the world*". The facts proved are that 535

feet was tried, but the paper produced *was not good enough for the market and the speed had to be reduced to 500 feet per minute* (p. 233). In order to run even at this speed the paper had to be made heavier than was desirable. In 1907, following Eibel's example, a high pitch of 12 inches was installed and the machine was speeded up first to 600 feet per minute, and later to 650 feet per minute, making good paper (p. 233). This company is licensed under the Eibel patent. The speed increase due to the pitch was 150 feet per minute, or 30 per cent.

2. *Bagley & Sewall machine at the Remington-Martin Company.* (Appendix, p. 234.) This, according to the Bagley & Sewall 1905 catalogue, (Dfts. Ex. T-2) had *"the world's record for speed"* and was *"the fastest machine in the world"*. The catalogue claims it ran at 585 feet per minute, but Superintendent Cowie of the Remington-Martin Company testified in the Remington-Martin case that speed as high as 520 had been tried, "but not steady", and that the regular speed prior to Eibel was 485 to 490 feet. The machine was running with flat wire when the Eibel patent came out. Thereupon, in 1907, this and the other Remington-Martin machine were given pitches of 18 and 20 inches, respectively, following and consequent upon Eibel's success at Rhinelander and the speed of this machine was thereby increased from 490 feet to 575 feet per minute, or about **18 per cent**; while that of the other Remington-Martin machine was increased from 440 feet to 550 feet per minute, or **25 per cent** (p. 236). These machines were the ones held infringements in the Remington-Martin case. Following the decision in that case their owner took a license under the Eibel patent.

3. *Bagley & Sewall machines at the Berlin Mills.*

(Appendix, p. 237.) These were four machines installed in the year 1904, and on February 10, 1906, they were called by Mr. Lansing, president of that company, in an article in "the Paper Mill", the *"banner installation of the world"*. He saw the machines running in October, 1904, and wrote in his diary:—

"Grand sight. 475 feet."

These machines were producing 40 tons each per day and running with flat wires prior to Eibel. In 1907, the Eibel Company installed high pitches of 11–14 inches in them and as a result *their production was increased from 40 to 50 tons per day,* or **25 per cent** (p. 238). The machines are of course licensed under the Eibel patent.

4. *Bagley & Sewall machine at the Laurentide Paper Company.* (Appendix, p. 238.) The Bagley & Sewall catalogue of 1905 says this machine *"has speed power beyond belief"*, and claims a speed of 553 feet per minute. The facts proved are that this machine originally started at 550 feet, but made paper so poor that *"they had to throw away a lot of the paper because it wasn't right, and work it over"*, and the speed therefore had to be reduced to 475–500 feet. Its speed in December, 1906, two months before the Eibel patent issued, was *481 feet per minute.* They had *"tried to run as fast as they could, but they could go so far and no farther"* (p. 239). In 1907, following and as a direct result of Eibel's invention, a high pitch of about 12 inches was installed on this machine and its speed increased, without any other change whatever being made in the machine, to *620 feet per minute,* and good paper made (p. 240). The increase of speed due to Eibel was therefore about 140 feet per minute, or nearly **30 per cent**. This company is licensed under the Eibel patent.

5. *Pusey & Jones machine at Palmer Falls, New York.* (Appendix, p. 240.) Defendant's witnesses claimed the speed of this machine prior to Eibel was 508 feet per minute; but if it did ever run at that speed it is clear that the production was irregular, for actual production records in evidence show that its actual output of paper corresponds to a maintained speed of only about 400 feet per minute. In 1907, following Eibel's success, the machine was given a high pitch of 14 inches and its speed increased to 560–575 feet per minute. Whatever the previous speed was, it is certain therefore, that the Eibel pitch gave a large increase. The machine is licensed under the patent.

6. *Pusey & Jones machine at Willamette Pulp & Paper Company.* (Appendix, p. 241.) This is said to have been a typical machine of the Pusey & Jones "Defender" type. Davis says these machines ran at a speed of 504 feet per minute. But the evidence in the Remington-Martin case showed that prior to Eibel the highest speed at Willamette was 450 feet per minute; that following Eibel a high pitch was installed and the speed increased to 640 feet, an increase of **40 per cent.** The company is licensed under the Eibel patent.

7. *Bagley & Sewall machines at St. Regis Paper Company.* (Appendix, p. 243). A letter from the St. Regis company to Bagley & Sewall of Feb. 19, 1903, says that these machines were running at 435 to 502 feet per minute and were producing *"more paper than any other four machines in the world"* of similar size. In 1907, following Eibel, high pitches of about 12 inches were installed on these machines and their speed increased to 575 feet per minute (p. 243). Even assuming a prior speed of 500 feet (which is not proved) this was an in-

crease of 15 per cent. The company is licensed under the Eibel patent.

8. *Bagley & Sewall machine at Raymondville Paper Company.* (Appendix, p. 244.) The Bagley & Sewall catalogue of 1905 called this Raymondville No. 1 machine the "most productive machine in the world". The catalogue says that the machine *"has rarely been run to exceed* 540 feet per minute", but there is no evidence that it was ever run at this speed, much less as to what its regular speed was prior to Eibel. In 1907, following Eibel, the machine was given a high pitch of 12 inches. There is no evidence what its regular speeds have been since the pitch was put in, but presumably the speed has been increased in the same proportion as in the other cases. The machine is licensed under the Eibel patent.

We thus find that the net result of all the evidence introduced by defendant to show higher speeds than 450 feet per minute prior to Eibel is this:—

(a) *There is no instance proved of any machine making paper at a regularly maintained speed of more than 500 feet per minute prior to Eibel.*

(b) There were, prior to Eibel's patent, about a half dozen machines at various places which were making paper at speeds varying from 450 to 500 feet per minute, two of these being called the "fastest machine in the world", another the "banner installation of the world", and a third being said to have "speed power beyond belief". All of these machines were running either with absolutely flat wires or with trival drainage adjustments of an inch or two.

(c) On most if not all of these half dozen most modern and fastest machines, attempts had been made to attain speeds greater than 500 feet per minute, because of the

universal desire for more speed, and in every case this effort had resulted in failure, and in subsequent reduction of the speed again to something not over 500 feet, at which speeds these machines were all running at the time Eibel's patent issued, in February, 1907.

(d) *In the year 1907, every one of these "fastest machines" was given a high Eibel pitch, directly as the result of Eibel's successful demonstration of his invention at Rhinelander. Every one of these "fastest machines", as a result of putting in the Eibel pitch, was enabled to get a great increase of speed, those increases running from 15 per cent or more in the case of the St. Regis machines to 40 per cent in the case of the Willamette machine and averaging between 25 per cent and 30 per cent. Every one of these machines is now licensed under the Eibel patent and paying royalties to the plaintiff.*

As to what the speed made by the *general run* of news machines prior to Eibel was (as distinguished from the phenomenal speed of these "record breakers"), we have, in addition to the testimony of Mr. Aldrich that the maximum was about 450 feet per minute (p. 24), the statement of defendant's witness Kinney (who testified about the "record-breakers") that the usual speeds in 1905 were "usually nearer 400 than 500" feet (p. 585, XQs. 470, 471); the statement of defendant's witness Ross, of the Beloit Iron Works of Beloit, Wis. (manufacturers of paper machines in the west), that prior to Eibel the maximum at which ordinary machines were run in the west was 400 to 450 feet per minute (p. 376, XQ. 379), and the testimony of defendant's witness B. F. Horne, of the J. H. Horne & Sons Company of Lawrence, Mass. (makers of paper machines whose field is

the east), that in 1905 or 1906 news machines in general "hadn't got up to more than 350 or 400 feet" (p. 766, XQ. 229).

The Court of Appeals in the Remington-Martin case was then putting the figures at least high enough when it said that the average speed of news machines prior to Eibel was 400 to 450 feet per minute, and Judge Hale's finding that "up to that time the usual speed of Fourdrinier machines had seldom exceeded 450 feet per minute, although the whole art was seeking greater speed" (Pamphlet, p. 29; 267 Fed. 853) is shown to be amply justified.

From the above specific instances we have seen that the fastest machines in operation prior to Eibel got speed increases averaging 25 per cent or 30 per cent as a result of putting in Eibel's pitch. These are typical instances of what has been accomplished throughout the art generally by Eibel's invention, and indeed the increases of speed which have been made upon the slower machines by using the Eibel pitch have naturally been greater in extent than those realized by the machines which were previously running the fastest.

Defendant's speed of about 600 to 625 feet per minute is typical of present day practice with the Eibel pitch. Defendant's witness Lansing, of the Bagley & Sewall Company, paper machine manufacturers, whose company has not built a machine since Eibel's patent issued that did not adopt his pitch (p. 663, XQs. 145, 146), says that news machines today run at approximately 600 feet per minute (p. 657, XQ. 87). Defendant's witness Kinney, also of the Bagley & Sewall Co., puts the average speed at which news is being made nowadays at "630 to 680 feet per minute" (p. 586, XQ. 493).

Contrasting these present speeds with the prevailing

pre-Eibel speeds of 400 to 450 feet per minute it will be seen that our assertion and the finding of Judge Hale that the use of Eibel's invention has made possible increases of production of 25 to 30 per cent is very conservative.

Defendant's witness Bailey, an experienced machine tender who has superintended the making of many installations of the Eibel invention, speaking of Eibel's machines at Rhinelander, says that by reason of the pitch their speed was increased from 420 to 550 feet per minute, and he says that this increase (which amounts to about 30 per cent), is "about a typical or average case of what you can do with the pitch" (p. 544, XQs. 370, 371). Even defendant's witness Ross, who is interested to minimize the result of the Eibel invention, concedes that the use of the Eibel pitch has increased speeds generally about 20 per cent (p. 395, XQs. 598, 599).

Taking the case of defendant's own machines, we have seen that defendant's counsel asserted in a brief in this case on a motion for a supersedeas of preliminary injunction, that if the defendant were to —

> "conform to what the plaintiff asserts is open to the public, its output would be reduced to such an extent, according to the admissions of the plaintiff itself, that defendant would be required to install two additional machines; costing one hundred thousand dollars ($100,000) each . . . before it could equal its present output."

In other words, on the defendant's own estimate, *if it were to stop using the pitch it would need six machines instead of four to make the paper that it now makes.* This means that the use of the pitch gives defendant's machines a production capacity of at least 25 per cent

and perhaps 50 per cent more than they would have without it.

Finally, as the Court of Appeals for the Second Circuit in the Remington-Martin case well said, even the present high speeds —

> "may at any time be exceeded, for the only limits which remain are certain practical factors, such as strength of machine parts, drying capacity, and ability of the workmen in handling the paper." (Pamphlet, p. 9; 234 Fed. 629.)

This prediction of increased speeds has already been realized by a number of mills by the use of automatic machinery which has recently been devised to relieve the workmen of the work of handling the paper.

The Great Northern Paper Company has recently built a machine designed to run at the speed of 1000 feet a minute (p. 765, XQ. 218).

It is clear that there is good reason for the universal use of the Eibel invention in news machines, and that Mr. Aldrich is right in saying that this is "*the most important contribution to the art of forming a sheet of paper which has ever come to my notice*" (p. 28).

CHAPTER III.

THE PRIOR ART.

In his specification at page 1, lines 80 to 89, Eibel sets forth the prior art as follows:—

> "The Fourdrinier wire has usually been arranged to move in a horizontal plane, although I am aware that *means have been provided for adjusting the breast-roll end of the wire to different elevations, usually below the level, to provide for running with different grades of stock — as for instance, with quick stock and slow stock;* but so far as I am aware the making wire has always had to perform the work of drawing along the stock. . . ."

The defendant has proved nothing whatever as to the prior art except that which Eibel here stated plainly on the face of his patent.

Since the difference in the result reached by the Court of Appeals for the First Circuit on the one hand and that reached by the District Court in this case and the Court of Appeals for the Second Circuit in the Remington-Martin case on the other, depends fundamentally upon the opposite views which these courts took as to the pertinency of these prior art drainage adjustments, it is vitally important for this Court fully to understand what their purpose was and how they were used.

The Court of Appeals for the Second Circuit finding that the prior patents and prior uses were merely "illustrations of the drainage adjustment which Eibel fully understood and referred to in his patent", that none of them showed the slightest appreciation or faintest conception of Eibel's "new principle of operation", that they were used merely as a means of regulating drainage, and

that they differed not merely in degree but in principle from Eibel's pitch, sustained the Eibel claims.

Judge Hale took the same view, which he amplifies at considerable length, concluding that, "It is evident that the trivial pitches in the prior art were used for a wholly different purpose from that of Eibel", that their use was "so inconsiderable in extent that any possible effect was apparently too small to be capable of observation", and that "They would give no help to anyone seeking to obtain further speed in the use of the Fourdrinier paper machine; they would give no hint in regard to any practical purpose of conforming the speed of the stock to the speed of the wire." (Pamphlet, p. 28; 267 Fed. 853.)

On the contrary, the Court of Appeals for the First Circuit substantially bases its decision upon its view that since gravity acts on a slight pitch in the same way as on a high pitch, and since every one knows that water flows down hill, users of these prior art drainage adjustments *must* have observed the relation between speed and pitch. From these premises it draws the conclusion that unless the Eibel claims are limited so as to include only a pitch sufficient to eliminate all drag, the claims "cover merely a degree" and are void for indefiniteness. The Court continually refers to these prior art adjustments, which it erroneously says are conceded by us to have been of as much as 4 to 5 inches (in fact, no instance of a greater adjustment than 3 inches is shown, as we have continually stated throughout the case); and the Court, assuming that these adjustments had the same effect as the Eibel pitch only in smaller degree, assimilates them to the 6 inch pitch now used on the defendant's No. 2 machine,* which is claimed to fall within the Eibel patent,

* This machine had a 14-inch pitch until after the suit was brought when it was dropped to 6 inches (*infra*, p. 101).

and is unable to draw any line of distinction between the two.

We shall show in the following discussion that not only is it true, as the Court of Appeals for the Second Circuit and Judge Hale found, that these prior art drainage adjustments did not at all foreshadow the Eibel purpose or effect, but that as a matter of fact they were almost always used in such a way as to get precisely the opposite results from that obtained by the Eibel pitch, that is to say, when they were used at all (as they seldom were) to give a slight downhill pitch to the wire, it was on slow running machines in which the stock was already, at its entrance upon the wire, running at least as fast as the wire, so that any acceleration which the stock got on the wire tended to make it exceed the speed of the wire and therefore to *cause* rather than to *decrease* commotion on the wire.

THE PURPOSE OF THE SLIGHT ADJUSTMENTS OF THE PRIOR ART WAS MERELY TO REGULATE DRAINAGE.

The phrase "quick" stock, used in the passage quoted above from Eibel's specification, means a stock which quickly loses its water, the fibres parting with the water readily; by "slow" stock is meant stock whose fibres part with the water slowly. The purpose of these adjustments which Eibel mentions is explained many times in the record. Mr. Aldrich discusses it fully at pp. 18–21. As he there points out, it is essential for the proper functioning of the machine that the sheet of stock shall have a fairly definite and certain consistency when it reaches the dandy-roll * and suction boxes. If it is too fluid, the

* The "dandy-roll" is a roller faced with wire cloth which is placed above the wire at a point beyond the first suction-box and in contact with the upper surface of the paper, and imparts to the upper surface

stock recovers from the displacement resulting from contact with the roll, and the effect of the dandy is lost, while if the stock is too dry the dandy does not do its work properly. Furthermore the sheet must be neither too wet nor too dry when it reaches the suction boxes and the smoothing and drying rollers. If too wet it cannot be carried across to the press rolls without breaking and if too dry the formation of the paper on the wire will not be proper.

The rate at which stock drains depends upon the character of the fibres, the extent to which they are "beaten", the manner in which they are ground, the temperature of the stock, the proportion of water to pulp in the stock, and other conditions; and there are a number of well-known methods of regulating drainage of the stock on the wire so as to bring it to the dandy-roll and suction boxes in a proper condition as to fluidity. The simplest and most obvious method, of course, is to regulate the grinding of the stock or the proportion of water in the stock. Another obvious expedient is to increase or decrease the number of suction boxes on the machine, or the vacuum in the boxes. Similarly, if it is desired to give the stock a longer time to drain before reaching the dandy-roll, a longer wire can be used, or if it is desired to decrease the drainage, a shorter wire can be used. The rapidity of the drainage also depends upon the height of the slice opening, since if a given quantity of stock per second is flowed on to the wire in the form of a thicker stream moving at a slower rate, it will drain more rapidly than if it be flowed on in the form of a

of the paper a texture similar to that which the lower surface receives from its contact with the paper-making wire. This dandy-roll also carries the design which impresses the "water mark" on the sheet in cases where a water mark is desired.

thinner stream moving at a quicker rate, because of the greater pressure, and also because it remains a longer time on the wire. Other expedients for regulating drainage might be mentioned, as, for instance, increasing or decreasing the number of table rolls, but it is unnecessary to refer to all of them.

These breast-roll adjustments of the prior art to which Eibel refers in the patent were merely one well-known means of regulating this matter of drainage. They were provided as a rather fine adjustment for drainage regulation. It is not always easy to get perfect conditions as to drainage by any of the expedients mentioned above, and these slight adjustments of the breast-roll up or down were provided in order to compensate for slight differences in the character of the stock, so that "slow" stock might be kept longer on the wire, and thus be given a greater time for drainage than "quick" stock, and *vice versa*. If the wire were pitched "up hill" slightly from the breast-roll, a pool of stock would be formed upon the wire near the breast-roll, and by reason of the increased pressure due to the weight of the water in the pool, the stock would drain more rapidly, and also would be given a *longer time* to drain before reaching the dandy-roll, than if the wire were horizontal. On the other hand, if the wire were given a slight downward inclination from the breast-roll, it would be on the wire a somewhat shorter time and therefore have *less* opportunity to drain before reaching the dandy-roll, than if the wire were horizontal. For slow stock, therefore, in cases where this adjustment was used, the wire would be made to run slightly up hill from the breast-roll. For quick stock, on the other hand, it would be run horizontal or with a slight downward inclination from the breast-roll.

The adjustment might also vary, according to the

thickness of the paper desired, since in making a thick paper there is more stock, per square inch, to drain and the stock should therefore be retained on the wire a somewhat longer time than in making a thin paper.

Even defendant's expert, Mr. Livermore, definitely admits that the purpose of the drainage adjustments had nothing in common with the theory of Eibel.

We quote his testimony (p. 994) : —

> "*X-Q.* 94. In the Barrett and Horne patent No. 634,228, which you have previously referred to, there is a statement of the purpose of the breast-roll adjustment provided in the machine at page 1, lines 26 to 30, and that I take to be substantially what you refer to in your answer to XQ. 78. [This is the statement we quote below at page 69 and sets forth the purpose of the drainage adjustment.] *Does this purpose have anything in common with the theory of the Eibel patent?*
>
> *A. I should say not.* It looks to me as if Barrett and Horne referred to the adjustment of inclination with one effect in mind, and that Eibel referred to like adjustment with another effect in mind."
>
> "Of course, whatever effect the adjustment will produce will be just the same whether an operator had that particular effect in mind or not in making the adjustment.
>
> "In this particular case, *the two effects have, so far as I can see, no special correlation to one another, and an adjustment made with one effect in mind might or might not produce a desirable effect as to the other function or phenomenon.*"

It is evident, then, that the trivial drainage pitches of

the prior art were, as Judge Hale finds, "used for a wholly different purpose from that of Eibel" (Pamphlet, p. 28; 267 Fed. 853).

We lay down as our main thesis, in dealing with the prior art, that in the passage quoted from the patent, *Eibel will be found to have made a complete statement of the prior art,* and that when the prior patents and supposed prior uses are scrutinized, it will appear that *in every instance where, prior to Eibel, the breast-roll was adjusted above or below the level, the purpose was that of the drainage adjustments referred to on the face of the patent, namely, "to provide for running with different grades of stock — as, for instance, with quick stock and slow stock".*

Both Judge Hale and the Court of Appeals for the Second Circuit in the Remington-Martin case so find.

We shall show also, that *no pitch greater than 3 inches is proved to have been used prior to Eibel even for drainage regulation,* and that according to the testimony of defendants' own practical witnesses no pitch of this minute extent is of any significance at all for the purposes of Eibel; that the use of the drainage adjustments was utterly foreign in principle to that of the Eibel pitch, as even defendant's expert, Livermore, admits in the testimony quoted above, and that *the drainage adjustments not only might be, but generally were, used under such conditions that while they served the purpose of regulating drainage, they actually increased instead of decreased speed difference between stock and wire, causing the stock to "overrun" (i. e.,* to run faster than) *the wire, thus increasing instead of eliminating waves and ripples on the sheet, and working diametrically opposite results from those of Eibel's pitch.*

If any one of these drainage adjustments was ever

used under conditions where it did tend to overcome a difference in velocity between stock and wire, that tendency was accidental, unnoticed and unappreciated; and it was insignificant in extent and led to nothing. In fact, at the time when Eibel made his invention the tendency was to cut down or even eliminate altogether these adjustments on high speed machines. Paper makers had found that they "did not help towards getting higher speeds", as defendant's witness Kinney of the Bagley & Sewall Co. says (Rec. 578, X-Q. 382–384).

We shall first discuss the prior patents and then the prior uses.

THE PRIOR PATENTS.

In the Remington-Martin case there were six United States and ten foreign patents in evidence. As to them the Court of Appeals for the Second Circuit said (Pamphlet, p. 12; 234 Fed. 630, 631):—

> "All show means for effecting a slight adjustment of the breast roll, and **none amounts to more than an illustration of the drainage adjustment, which Eibel fully understood and referred to in his patent. The patents demonstrate that skilled men prior to Eibel did not appreciate the possibility of raising the breast roll end of the machine more than an inch or two, and that none of them had the faintest conception of the principle of operation which characterizes the Eibel invention.**"

We put in evidence in this case these same six United States and ten foreign patents which were before the Court in the Remington-Martin case (p. 127), because they show by clear record evidence what the actual state of the art was in the fifteen years prior to Eibel. The patents range in date from 1893 to 1906. They shed so

much light upon the "prior uses" that we were unwilling to have them neglected. They are summarized by Judge Hale at Pamphlet pages 25–27; 267 Fed. 851, 852, and are discussed in detail by Mr. Aldrich at Rec. pages 127–146.

We shall not in this brief repeat the detail explanation of the prior patents which Mr. Aldrich gives, but shall merely deal with them generally, referring the Court to Mr. Aldrich's testimony for a more complete discussion of them.

All of the patents show means for effecting a slight adjustment of the breast-roll of a Fourdrinier machine up or down. No one of them claims any novelty in respect to the adjustment broadly; some of them have claims covering the specific mechanism by which it is effected, and others merely show it in connection with other features of a Fourdrinier machine, making no mention of it whatever in their claims.

No one of these patents is anything more than an illustration of the drainage adjustment which is referred to on the face of Eibel's specification, and most of them were in practice abandoned, as the testimony shows that *at the time of Eibel's invention most paper machines were running with their wires horizontal* (*supra,* p). In all cases the extent of the adjustment which is provided for is utterly insignificant, being limited at the utmost to a possible two or three inches above or below the level. In many of the patents the only adjustment provided for is from a position in which the breast-roll is *below the level,* up to a horizontal position of the wire and no further.

Among others of these patents which show only an adjustment of the breast-roll *below level* may be

mentioned the German patent to Andres No. 83,020 (Rec. p. 1072).

The mere fact that these prior adjustments provided indiscriminately for running the wire either up hill or down hill is entirely sufficient to show the utter dissimilarity of the principle on which they were based from that of the Eibel invention; for never, under any circumstances, could the Eibel principle be carried out with an upwardly-pitched wire.

In a number of instances (as in the Barrett & Horne patents quoted below) the patentees definitely and clearly describe the purpose of the adjustments as being to provide means for dealing with stock of various grades, *i. e.*, of different degrees of water-retentiveness; in other cases no mention whatever is made of the purpose of the adjustment; and in not a single case is there any hint that it is for the Eibel purpose of reducing the difference in velocity of stock and wire, giving the stock a gravity acceleration, doing away with the waves and ripples caused by excessive difference of velocity between stock and wire, or of increasing the speed of production of the machine.

A typical statement of the purpose of these adjustments is to be found in the British patent to Davidson & Kitchen No. 14,193 of 1895 (Rec. p. 1061), where it is said that the object of the invention is "to produce a close and perfect sheet of paper, even when changing from a pulp which parts with its water freely to a pulp which does not, or from a thick to a thin sheet, and this without stopping the machine" (p. 1, lines 25–27).

Defendant refers to only one prior patent not in evidence in the Remington-Martin case, namely, Barrett & Horne patent No. 691,333 (Rec. p. 1042), which adds nothing whatever to the other patents, and is a mere im-

provement on an earlier Barrett & Horne patent No. 634,228 (Rec. p. 1015), which was in evidence in the Remington-Martin case and which is discussed by Mr. Aldrich at Rec., page 130. The improvement of the later patent consists merely in that the breast-roll adjusting devices are placed above instead of below the shake frame, so that they will be out of reach of water falling from the machine, it having been found that when the adjusting device was placed near the floor, as in the structure of the earlier Barrett & Horne patent, it was rusted by constant wetting.

The *purpose* of the adjustment is the same in this later patent as in the earlier one, namely, "to adapt the machine for pulp of different kinds or grades" (p. 1, lines 17, 18). (See also testimony of Messrs. Barrett and Horne to this effect, p. 779, XQs. 222–235; pp. 797, 798, XQs. 137–144.) Referring to the earlier patent, No. 634,228 (Rec. p. 1015), we see that the manner in which the adjustment adapts the machine "for pulp of different kinds or grades" is fully explained at page 1, lines 16 to 30, as follows: —

> *"In certain kinds of pulp, notably the wood-pulp which is now largely used in making paper, the water drains away very rapidly, so that the pulp may become nearly dry before it leaves the shake-frame, and thus not be properly laid when it reaches the rollers. This tendency may be obviated to a considerable extent by downwardly inclining the shake-frame toward the rollers, so that the water tends to travel along with the pulp and will not, therefore, drain out through the wire so rapidly. It is further desirable that the amount of inclination or slope should be variable, so as to adapt the machine for pulp of different kinds or grades."*

There could not be a clearer statement that the reason for the slight downward inclination of the wire (two or three inches at most) which the patent provides is to prevent the difficulty which arises when certain kinds of pulp in which the water drains away very rapidly (*i. e.*, "quick" stock) are used, namely, that the pulp becomes too dry to be properly laid when it reaches the rollers. By giving the wire a downward inclination this drainage difficulty is obviated because the water is carried farther down the wire.

The Barrett & Horne adjustment is a typical example of those adjustments of the prior art which are expressly referred to on the face of the Eibel patent at page 1, lines 80 to 87.

The striking fact which these patents prove is that prior to Eibel no one supposed it possible to raise the breast-roll end of the machine above the level more than a scant two or three inches, for none of these patents show any adjustment possibility either up or down greater than this. Such a trivial pitch is completely useless for the purpose of Eibel (*infra*, p. 138), and is expressly excluded from Eibel's claims, since these are limited to machines having a *substantial* pitch.

The prior patents furnish the best possible evidence that substantial elevations of the breast-roll were never conceived of, for *the patentees who patented these inventions represent the most advanced workers in the art* and none of them saw the possibility of any such elevation.

Judge Hale finds (Pamphlet, p. 27; 267 Fed. 852) :—

> "The patents tend, rather, to illustrate adjustments well known to the whole art before Eibel, and referred to at lines 82 et seq. of his specification. They do not disclose that these adjustments are for

the Eibel purpose of reducing the relative speed of stock and wire, giving the stock a gravity acceleration, and thus doing away with the waves, ripples and wrinkles caused by the difference of speed between the stock and the wire."

None of these prior patentees had any conception of the fact, first recognized by Eibel, upon which his invention was based, that it was the relative velocity between stock and wire which caused the commotion on the wire and put a limit upon machine speed. If *inventors* and machine manufacturers saw no correlation between the pitch of the wire and speed, the Court will not be surprised to find that the uneducated workmen who have testified to the various "prior uses" in this case did not see any.

The Court of Appeals for the First Circuit makes no mention at all of any of these prior patents and in spite of the utter barrenness of this authentic record of the art of any suggestion that a pitch might be used to increase machine speed, says in substance, that workers handling the adjustments shown by these patentees, *must* have been familiar with Eibel's principle.

THE PRIOR USES.

In the Remington-Martin case there were eight of these alleged prior uses, in all substantial respects the same as those referred to in this record (four of them being the same identical ones as four of the eleven set up by the defendant in the present case).

After considering the evidence as to these eight prior uses, the Court of Appeals for the Second Circuit said (Pamphlet, pp. 12, 14; 234 Fed. 631, 632):—

"We think it is clearly established that no one of

> **the alleged prior users had any understanding or appreciation of the Eibel principle.** The question then remains whether as a matter of fact the Eibel principle was operated and whether, therefore, his contribution is merely an improvement representing an advance in degree. . . . We think the evidence establishes that no one before Eibel had any knowledge of his theory; that where not abandoned the slight pitches were used in most instances to bring stock to the dandy roll more quickly than when the horizontal wire was used, thus giving it less time to drain and causing it to reach the dandy roll in a more fluid condition. . . ."

A study of the testimony as to the prior uses relied upon in the present case inevitably leads to the same conclusion as that which the Court of Appeals for the Second Circuit reached in the Remington-Martin case.

Judge Hale states this conclusion as follows (pamphlet, pp. 27, 28; 267 Fed. 852, 853) :—

> "After a careful study of all the evidence offered by the defendant to prove anticipation, either in patents or by a prior use, I am led to the conclusion that no one of the prior inventors, or alleged users, disclose any of the inventive purpose of Eibel. No one shows any knowledge of any relation between the pitch of the wire and speed, or of the use of gravity to aid the other elements in well known use before Eibel. From a study of the proofs now before me, I see no reason to differ with the Court of Appeals in the Second Circuit in its conclusion that no one before Eibel had any knowledge of his theory.
>
> . . .
>
> "It is evident that the trivial pitches in the prior

art were used for a wholly different purpose from that of Eibel."

In the present case there are eleven of these prior uses as to which defendant took testimony. These represent the result of a scouring of the whole country by defendant for evidence with which to defeat the Eibel patent, in which it had the aid not only of four of the largest manufacturers of paper machines in the country (Bagley & Sewall Company, Beloit Iron Works, Moore & White and J. H. Horne & Sons Company, witnesses from all of which companies testified for defendant in the case), but also of at least a dozen paper manufacturers scattered over the country which are contributing to the expenses of the defense in this case (Rec., p. 165, Q. 9).

At the outset we point out that if it did not occur to the prior patentees, who represented the most advanced and skilled workers in the art, that high speeds could be obtained by using a high pitch in the Eibel manner, it is not very likely that ordinary machine tenders (from whom the testimony as to the prior uses mainly comes) had that conception.

Moreover, the very number of the alleged prior uses is an argument against the validity of any of them. If this 2 or 3-inch adjustment had been used in only one obscure mill, say, it might be argued with more plausibility that the reason it did not lead to the adoption of a high pitch in the art was that it was not generally known. But here it appears that *the whole art was familiar with these drainage adjustments, and yet no one thought of using a pitch of any substantial extent, and thereby getting increased speed, until Eibel showed them how; and on the contrary at the time of Eibel's invention these adjustments had been abandoned on most of the fastest ma-*

chines. When Eibel invented the high pitch they all jumped at the idea and by following his lead got increases of speed of 25 per cent to 30 per cent or more. Naturally we find witnesses—and even men with the best of intentions, now that Eibel has succeeded—imagining, and perhaps persuading themselves, that what in fact they have learned from Eibel and have been using ever since his patent came out in 1907, was known to them, in theory at least, before Eibel. The greater the success of a patent, the more there always are of such claimants.

But the actual facts as to *what these witnesses did and what they did not do* are a convincing answer to any claim that they knew the Eibel invention, even if such a claim were made in the clearest language by a hundred witnesses.

The facts in the often cited case of *Loom Co.* v. *Higgins,* 105 U. S. 580, are closely analogous to those here. In that case this Court said of Webster's invention (p. 591):—

> "It is plain from the evidence, and from the very fact that it was not sooner adopted and used, that it did not, for years, occur in this light to even the most skilful persons. It may have been under their very eyes, they may almost be said to have stumbled over it; but they certainly failed to see it, to estimate its value, and to bring it into notice. . . . *Now that it has succeeded, it may seem very plain to any one that he could have done it as well.* This is often the case with inventions of the greatest merit."

And the Court continues:—

> *"It was certainly a new and useful result to make a loom produce fifty yards a day when it never before had produced more than forty."*

It may seem very plain to these "prior users" of the Eibel invention that "they could have done it as well", but the fact remains that *they never did it.* Workers in the art all knew of the drainage adjustments, but they ran their machines absolutely horizontal in most cases, and practically so in all cases. Paraphrasing the language quoted, "it was certainly a new and useful result to make a Fourdrinier machine produce 600–680 feet of paper a minute when it never before had produced more than 500".

This Court does not need to be instructed as to the extent of the burden which rests upon a party setting up a prior use as a defence. That prior use must be established *"beyond a reasonable doubt".*

In the often cited *Barbed Wire Patent case,* 143 U. S. 275, 284, where some 24 witnesses were produced by defendant who testified in support of a defense of prior use, this Court said as to this class of testimony:

> *"In view of the unsatisfactory character of such testimony, arising from the forgetfulness of witnesses, their liability to mistakes, their proneness to recollect things as the party calling them would have them recollect them, aside from the temptation to actual perjury, courts have not only imposed upon defendants the burden of proving such devices, but have required that the proof shall be clear, satisfactory and beyond a reasonable doubt."*

The Court remarked, pp. 284, 285, that

> "almost every important patent, from the cotton gin of Whitney to the one under consideration, has been attacked by the testimony of witnesses who imagine that they had made similar discoveries long before

the patentee had claimed to have invented his device".

This *Barbed Wire case* represents the law of the subject as universally applied.

A typical case applying the rule is *Thayer* v. *Hart*. 20 Fed. 693, in which Judge Coxe said:—

> "It is so easy to fabricate or color evidence of prior invention and so difficult to contradict it, that proof has been required which does not admit of reasonable doubt. Where interests so vital are at stake, where intervening years have made perfect accuracy well nigh impossible, where an event not deemed important at the time, has been crowded from the memory and obscured by the ever varying incidents of an active life, it is not difficult to imagine that even an honest man may be led erroneously to persuade himself that the fact accords with his inclination concerning it."

No case could afford a better illustration of the principle that oral testimony long after the event is unreliable even as to simple matters of fact, such as the number of inches in a breast-roll adjustment, the date of its use or the speed of the machine, than the present case, for the record contains many instances where witnesses, presumably honest, have made perfectly definite statements as to the extent or date of a pitch on the prior use machines only to have their evidence completely upset by record evidence, such as the production of the actual drawings of the machine. See, for example, the instances cited below at pages 184–188; 199–200; 222; 224; 229–230.

When it comes to testimony as to the *purpose* for which these pitches were used years ago, and the relation between the speed of the wire and the speed of the stock,

there is infinitely greater possibility of error, for the witnesses now know and have known for many years all about the Eibel invention and the purpose and effect of the Eibel patent, and nothing is easier or more natural than for even an honest witness, well disposed to the defendant and anxious to defeat the patent, to make himself believe that his present knowledge dates back to an earlier period.

Coming now to the specific cases of alleged prior use referred to in defendant's testimony, we find that there are eleven of these, which, listed in the order in which they are presented by defendant's expert, Mr. Carter, in his "Diagrams" (Dfts, Ex. W., pp. 165, 167, 169 following p. 1092), are as follows:—

1. Bayless-Austin prior use (Bayless Manufacturing Company, Austin, Pennsylvania).

2. Kimberly-Clark prior use (at Kimberly, Wisconsin).

3. Lisbon Falls prior use (Pejepscot Paper Company, Lisbon Falls, Maine).

4. Bagley & Sewall prior use (certain machines manufactured by Bagley & Sewall Company, at Watertown, New York).

5. Kimberly-Clark prior use at Niagara, Wisconsin.

6. Palmer Falls prior use (International Paper Company, at Palmer Falls, New York).

7. King Paper Company prior use (Kalamazoo, Michigan).

8. Northern Paper Company prior use (at Green Bay, Wisconsin).

9. Pejepscot Paper Company prior use (at Pejepscot, Maine).

10. Rhinelander Paper Company prior use (at Rhinelander, Wisconsin).

11. International Paper Company prior use (at Niagara Falls, New York).

The last two named, Rhinelander and International Paper Company at Niagara Falls, are not referred to in Mr. Carter's diagrams nor in defendant's brief in the Court below, and we judge that defendant places no reliance upon them. They were both relied upon by the defendant in the Remington-Martin case, and as to both of them the Court of Appeals for the Second Circuit merely said that they did not "merit discussion" (Pamphlet, p. 12; 234 Fed. 631). We shall not therefore take up space by further mentioning these two prior uses except in the appendix (*infra*, pp. 227, 229).

As to a third of the eleven prior uses, namely, that at Pejepscot, it is not even alleged by any witness whatever that the machines had any pitch at all at any date prior to the date of Eibel's application for his patent, and therefore, although Mr. Carter has for some reason included this Pejepscot supposed prior use in his diagrams, we shall not discuss it further except in the appendix (p. 226).

Of the remaining eight prior uses, two (namely, those at the Northern Paper Company and at Palmer Falls) were both before the Court in the Remington-Martin case, and were held by that Court immaterial.

As to all these prior uses, we lay down the following three propositions:—

1. *As to each and every one of them, the purpose of the adjustment was mere drainage regulation;* and though some witnesses tried to give the impression that they recognized the Eibel principle and used the pitches for that purpose, in every case the contrary is proved out of the mouth of one or more of defendant's own witnesses.

2. *In no single case is there proved a pitch greater than 3 inches, and usually there were only 1½ or 2 inches.* Such trivial pitches, though adequate for drainage regulation, are utterly insignificant for Eibel's purpose. Some witnesses made statements (but without any record evidence whatever to support them) that higher pitches than this were used, even up to 6 inches in one or two cases, and Carter's diagrams assume pitches varying from 4 to 6 inches. But in *every case* it was brought out sooner or later, usually by cross-examination in the light of actual machine drawings, that the story of a higher pitch than 3 inches was not true and this was definitely admitted by at least one witness for defendant in every case. As a matter of fact, in the Remington-Martin case higher drainage adjustments were asserted than are proved in the present case, for the Court of Appeals there found that—

> "The prior art showed instances where the pitch of the wire had been 2 or 3 inches, and in two isolated cases up to 6 inches." (Pamphlet, p. 9; 234 Fed. 629.)

But in the two cases where the 6-inch pitch was said to have been tried (Raymondville and Northern Paper Companies), as the Court found, it was *unsuccessful and abandoned after a brief trial* (Pamphlet, pp. 13, 14; 234 Fed. 631, 632).

3. *In most of these prior use* machines on which a pitch was used, the conditions are shown by the testimony of defendant's own witnesses to have been such that its *effect would necessarily be to cause "over-running" of the stock on the wire.* They were low speed machines whose wires ran at say 300 feet per minute or less, and they carried "heads" sufficient to give the stock a

greater initial velocity than their low wire speeds; that is to say, *on these machines the "head" and the wire speed were such that the stock entered upon the wire at a speed equal to or greater than the speed of the wire, so that the effect of the pitch was to increase and not decrease speed difference between stock and wire, and to cause, and not eliminate, waves and ripples and disturbances on the sheet* (insofar as such a trivial pitch could have any effect at all). The effect of these pitches while entirely satisfactory to accomplish their purpose of drainage regulation, was therefore *the exact opposite* from that of Eibel's pitch.

The discussion in detail of all these many "prior uses" is a tedious task, and we have therefore reserved this detailed discussion for the appendix to this brief, here only summarizing the salient facts common to them all. We wish the Court would at least take the time to select some one of the "prior uses"—whichever one seems to be most relied upon by the defendant, and run through our analysis of the testimony regarding it in the appendix.

1. Every One of the Prior Use Pitches is Admitted by One or More of Defendant's Witnesses to have been Merely for Drainage Regulation.

In this section we shall not enter into details (the full discussion in the appendix quotes chapter and verse where the testimony is to be found), and we shall cite only statements made by *defendant's own witnesses.*

Bayless-Austin prior use (Appendix, pp. 175, 179-181). *Brown* says that the reason for the pitch was "so as to carry more water down over the wire to the suction boxes". *Anderson* also says that it was a mere matter of the drainage of the stock. *Bayless* likewise says that they were making a light-weight paper and if they had

not used the pitch "the water would immediately drop away from it before it ever reached the suction boxes" and the paper formed would be too dry. *Barrett* and *Horne,* of the J. H. Horne Company, who devised the breast-roll adjustment mechanism used in these machines and showed it in their patent No. 691, 333 (*supra,* pp. 68, 69), both agree that the purpose was to get the stock to the suction boxes with more moisture than it would have without a pitch. The adjustment provided for running uphill as well as downhill, the uphill adjustment being used when the stock being run was "slow", or when heavy paper was being made.

Kimberly-Clark prior use at Kimberly (Appendix, pp. 191–194). *Thom* says that the purpose of the pitch was to cause the stock to "reach the dandy roll a certain consistency" and that what determined whether the wire should be above or below the level, and if above the level how high above the level, was its "quickness" or "slowness". *Ross* also says that it was a matter of drainage. *White,* the builder of the adjustment mechanism, says "they wanted to carry the water nearer the suction boxes, that was the reason for lifting the wire".

Lisbon Falls prior use (Appendix, pp. 167, 170). *Hall* says that the idea of running the machine with a little pitch downhill was "carrying the water nearer to the suction boxes", so that the water would not drain out so fast.

Bagley & Sewall prior use (Appendix, pp. 202, 203). *Kinney* says the reason for the adjustment was that with free stock you want the breast-roll up so as to carry the water down farther toward the suction boxes, and the news stock was free stock. *Lansing* says the same thing.

Kimberly-Clark prior use at Niagara (Appendix, pp.

209, 211). *Le-Valley* says that the reason for the pitch was "to help drain the water". *Thom* says that it carried the water farther down the wire.

Palmer Falls prior use (Appendix, pp. 215, 216). *Ross* says that the blocking under the breast-roll on these machines was a matter of drainage. Other witnesses, in the effort to show that the pitch had some other purpose, get very much mixed up, Argy, for instance, testifying that its purpose was to "overcome the resistance of the air", a most extraordinary idea.

King Paper Company prior use (Appendix, p. 221). *Ross,* the only witness as to this prior use, admits that the purpose of the adjustment on this machine was mere drainage regulation, to have stock come down to the suction boxes or to the dandy roll with some particular degree of consistency as near as possible.

Northern Paper Company prior use (Appendix, pp. 223, 225). *Ross,* the only witness, says that the company was making tissue paper, which is a thin sheet from which the water drains quickly, and that the downhill adjustment was used to help carry the water down to the dandy roll.

As to every one of these prior uses, therefore, it expressly appears by the admissions (freely given or grudgingly extracted) of defendant's own witnesses, that the pitch, whatever it was, was used for the purpose of drainage regulation and that it was therefore one of those instances mentioned by Eibel on the face of his patent where, prior to his invention,

> "means have been provided for adjusting the breast roll end of the wire to different elevations . . . to provide for running with different grades of stock—

as, for instance, with quick stock and slow stock." (p. 1, lines 82–87,)

a purpose which as even defendant's expert, Livermore, admits, *has nothing in common with Eibel* (*supra*, p. 64).

2. In Most of the Prior Uses the Pitch Increased Difference of Velocity Between Stock and Wire—the Exact Opposite of Eibel.

The purpose of the drainage adjustments was utterly foreign to that of Eibel. In regulating drainage you ran the wire slightly uphill if you had a slow stock, and you ran it slightly downhill if you had a quick stock. The thing that determined the direction and extent of the adjustment was the character of the stock, and no attention was paid to the relative velocity of stock and wire. Accordingly, it might well happen that a downhill adjustment for drainage regulation would be used under such conditions that while it served the drainage purpose of bringing a "quick" stock to the dandy roll and suction boxes with more water in it than if the wire were flat, yet it caused an increase rather than a decrease of speed difference between stock and wire, *i. e.*, caused "over-running" of stock on wire; and in fact in most of the prior uses this is exactly what happened, as is shown by defendant's own witnesses.

The machines referred to in the "prior use" evidence were in most cases low speed machines, making usually book paper or some other heavy paper, and running at wire speeds of 300 feet per minute or less; and the usual *head, i.e.,* depth of the pond of stock back of the slices, under the pressure of which the stream of stock issues, was great enough to *start* the stock on the wire at a speed

already as great as or greater than the wire speed of the machine.

Here again we shall not go into details, referring the Court to the appendix for the citations in support of our statements, and merely summarizing the testimony; and here again we quote only defendant's own witnesses.*

Bayless-Austin prior use (Appendix, pp. 175, 181–4). Here the head carried was 6 inches, which produces an initial velocity of stock on the wire of 330 feet per minute. But the maximum possible wire speed was 300 feet per minute, and the regular speed about 275 feet per minute; so that the stock must have entered upon the wire at a speed already greater than the wire speed, and the effect of any pitch was *merely to increase that speed difference.*

Kimberly-Clark prior use at Kimberly (Appendix, pp. 191, 195–7). Here the head carried was 4 to 6 inches. Taking an average of 5 inches, the initial stock speed would be 295 feet per minute. The maximum wire speed on these machines was 275 feet per minute, and they sometimes ran as low as 60 to 70 feet a minute. The stock, therefore, entered upon the wire at a greater speed than the wire speed, and any pitch simply increased the speed difference.

Kimberly-Clark prior use at Niagara (Appendix, pp. 209, 212–3). Here the head carried was 6 to 8 inches, giving an average initial stock speed of 350 feet per minute. The machine ran at widely varying wire speeds from as low as 185 feet per minute to as much as 440 feet per minute, but there was never any change in the pitch de-

* In some of these cases there are discrepancies between various witnesses as to heads and speeds. The figures used by us are in every case supported by one or more witnesses for the defendant.

pending upon the wire speed. At wire speeds below 350 (which were used fully half the time) any pitch would cause over-running of the stock on the wire, and while at speeds from 350 to 440 it might not actually cause over-running it would be of no appreciable value since such speeds were readily obtainable on a perfectly flat wire.

King Paper Company prior use (Appendix, pp. 221–3). Here there is no evidence as to the conditions under which the machine was run, but it was built for an 8-inch head and for wire speeds ranging from 30 feet to 205 feet per minute. An 8-inch head would give an initial stock speed of 380 feet, and even half of that 8 inches would give an initial speed of 260 feet a minute, so that the stock evidently always entered upon the wire at speeds far in excess of the wire speeds, and any pitch merely increased the speed difference.

Northern Paper Company prior use (Appendix, pp. 223, 225). Here the head was 5 inches, giving an initial stock speed of about 295 feet per minute, and the maximum paper speed was 300–350 feet per minute. The machine sometimes ran as low as 125 feet per minute. The initial stock speed was, therefore, usually greater than the wire speed, and any pitch merely increased the over-running; in fact it was because of poor paper resulting from using the pitch that the pitch was abandoned, as appeared in the Remington-Martin case.

As to most of the other prior uses, such as Bagley & Sewall, etc., there is not sufficient evidence as to conditions on the machine so that it can be determined whether or not there was over-running on them.

The very heart of Eibel's invention was the use of a high pitch as a means of decreasing difference of velocity between stock and wire—of causing the stock to run at

equal speed with the wire. *Such pitch as there was in these prior uses produced exactly opposite results—it increased the difference of velocity between stock and wire.*

3. No Pitch Greater than 3 Inches Prior to Eibel is Proved in any Instance.*

Of course, we do not assert that no witness testified to a pitch greater than 3 inches prior to Eibel. A number of such loose statements were made, some of the witnesses mentioning figures as high as 6 inches, and defendant's expert Carter has adopted these figures on his diagrams, showing pitches of 4 to 6 inches.

But we do say most emphatically that not only was there no reliable evidence in support of such statements in any case, but furthermore *in every single case where such a claim was made the claim was ultimately disproved out of the mouths of defendant's own witnesses, usually because upon the production of actual drawings it was found that a pitch greater than 3 inches could not have been obtained.*

In this, as in previous sections, we shall give only the ultimate facts, referring to the appendix for citations, and here again we shall refer only to testimony of defendant's own witnesses.

Bayless-Austin prior use (Appendix, pp. 175, 184–8). Here Carter's diagram assumes a pitch of 5 inches on the No. 1 machine and of 4½ inches on the No. 2 machine.

*(The opinion of the Court of Appeals for the First Circuit repeatedly says that we conceded that "the prior art shows elevations of 4, and perhaps 5, inches" (Pamphlet, pp. 43, 47, 55; 274 Fed. 544, 545, 547, 551). This is incorrect. We have consistently asserted that the utmost extent of any adjustment proved in the prior art was 3 inches. This section is taken *verbatim* from our brief before the Court of Appeals for the First Circuit.)

But the superintendent, *Anderson,* testified that no pitch at all was used on the No. 2 machine until 1912, five years after Eibel (p. 178); and *Barrett,* the builder of the machines, who originally testified that there was a breast-roll adjustment which would give 6 inches elevation above the level, upon being confronted with the actual drawings of the machines, finally admitted that if the machines were constructed like the drawings (as he testified that they were) the utmost possible elevation above the level was 3 inches, and there was a like adjustment below the level (pp. 186–7). *Horne,* who co-operated with Barrett in constructing this breast-roll adjustment, testified that the drawings of the machines showed a maximum possible elevation above the level of only 2¼ inches (p. 188).

Kimberly-Clark prior use at Kimberly (Appendix, pp. 191, 199). Carter assumes a pitch of 5½ inches in his diagrams. Defendant's brief in the court below said 4 inches. But *Ross* testifies that no pitch at all was used on these machines until about November 1906 (which was four months after Eibel's application date), and that then it was between 3 and 4 inches (p. 198), and the actual drawings of the machine produced by *Mr. White,* of Moore & White, the builders of the adjusting mechanism on the machines, show a maximum adjustment above the level contemplated of only 2½ inches to 3 inches, as Mr. White admits, with a similar adjustment below the level (pp. 200–1).

Lisbon Falls prior use (Appendix, p. 167). Carter in his diagram assumes a pitch of 4 inches. An adjustment of 2 inches is proved by a diary entry of *Dickinson,* and there is no evidence worthy the slightest attention of anything higher (p. 170).

Bagley & Sewall prior use (Appendix, p. 202). The blue-prints of these machines (which furnish the only evidence we have about them) show an adjustment for raising and lowering the breast-roll, which *Kinney* says allowed of elevating it 3 inches above the level. Carter assumes in his diagrams 3½ inches, but there is no basis for the extra half inch.

Kimberly-Clark prior use at Niagara (Appendix, pp. 209, 210). Carter assumes 4 inches in his diagram, but there is no adequate evidence of any pitch at all prior to Eibel being used on these machines, the sole testimony being mutually contradictory statements of two witnesses, based on no record evidence whatever.

Palmer Falls prior use (Appendix, pp. 215, 216). Carter in his diagram assumes a pitch of 3 inches, but *Argy* testifies that it was 2½ inches.

King Paper Company prior use (Appendix, p. 221). Carter's diagram assumes a pitch of 4 inches, but *Ross*, the only witness on the point, after being confronted with the drawings of the machine, finally admitted that they could not have had an adjustment of over 2 inches above the level (p. 222).

Northern Paper Company prior use (Appendix, pp. 223, 224). Carter assumes a pitch of 5 inches, but *Ross*, the only witness, although he originally stated that it was 5 inches, finally, after seeing the drawings of the machine, said instead that it was "about 3 inches", and that he would not care to question the accuracy of the testimony of his draftsman Larsen, in the Remington-Martin case, that it was less than 2 inches, with a corresponding adjustment below the level.

SUMMARY OF PRIOR PATENTS AND PRIOR USES.

Our review of the prior uses and prior patents brings us back again to exactly the point where we started, that is to say, to the statement in the Eibel specification that, although "the Fourdrinier wire has usually been arranged to move in a horizontal plane", yet sometimes "means have been provided for adjusting the breast-roll end of the wire to different elevations, usually below the level, to provide for running with different grades of stock—as, for instance, with quick stock and slow stock".

We have shown that this was the avowed purpose of the adjustments shown in the prior art patents, and that it is proved by defendant's own witnesses to have been the purpose in the case of every one of the prior uses.

We have also seen that these drainage adjustments were so utterly foreign in purpose to that of Eibel, that in most cases where they were used they actually caused "over-running" and *increased* speed difference between stock and wire instead of *decreasing* it, therefore working in diametric opposition to the Eibel principle and except for their trivial extent, would have injured formation of the paper; and that in no case prior to Eibel was any such pitch used for the purpose of speeding the stock up to speed equality with the wire or so as to eliminate disturbances on the sheet and make increased speed possible. Finally, we have seen that no prior patent and no prior use showed any breast-roll elevation of more than 3 inches—trivial pitches which, while sufficient for the purpose of drainage regulation, were altogether *insufficient* for any substantial results as far as the purposes of Eibel are concerned.

As the Court of Appeals said in the Remington-Martin case, no one before Eibel had the "faintest conception" of the principle of operation he gave to the art.

Indeed, the testimony taken by defendant in the effort to prove these prior uses most convincingly establishes the novelty and very great merit of the Eibel invention, for it is through defendant's prior use witnesses that the facts are so well developed as to the great desire for speed which pervaded the art, the instant adoption of the Eibel pitch by these same prior users in common with the other news manufacturers, as soon as Eibel demonstrated it at Rhinelander, and the enormous speed increases which they obtained thereby.

Typical of the history of what these "prior users" did before and after Eibel's patent issued is the story told by Messrs. Kinney and Lansing, of the Bagley & Sewall Company (Appendix, pp. 205–8). This company had been supplying machines prior to Eibel's date with adjustments whereby the breast-roll might be raised or lowered an inch or two, and in some cases as much as 3 inches, for purposes of drainage regulation. On the faster machines, however, the extent of these adjustments, instead of increasing above 3 inches, had been decreased to not over 1½ inches or 2 inches, because, as Mr. Kinney said, *the paper makers "found that the adjustment did not help towards getting higher speeds"*; (Rec. p. 578, XQ. 383, 384). Then the Eibel patent came out and the news of it and of its successful operation at Rhinelander spread throughout the trade, and came to the ears of the Bagley & Sewall Company. As a result *since that date not one news machine built by the Bagley & Sewall Company has been installed without a high pitch* (Appendix, p. 207).

Such a history as this (and it is only one of many) shows how idle it is for defendant's counsel and experts to argue that the prior patents or prior uses embodied Eibel's invention.

Judge Hale was clearly right in holding that "no one

of the prior inventors, or alleged users, disclose any of the inventive purpose of Eibel" (Pamphlet, p. 27; 267 Fed. 852) and the Court of Appeals for the Second Circuit was right in finding that "it is clearly established that no one of the alleged prior users had any understanding or appreciation of the Eibel principle" (Pamphlet, p. 12; 234 Fed. 631).

THE VIEW OF THE CIRCUIT COURT OF APPEALS FOR THE FIRST CIRCUIT AS TO THE PRIOR USES.

The Court of Appeals for the First Circuit specifically refers to only one of these alleged prior uses—the one at the Northern Paper Mills, which it says "effectually disposes of" claims 7 and 8 (Pamphlet, p. 45; 274 Fed. 545). (Claims 7 and 8 do not in terms refer to the extent of the pitch but Judge Hale properly interpreted them as calling for a pitch "substantially as described" in the patent. Pamphlet, p. 33, 267 Fed. 856.) The testimony shows that the adjustment on this Northern Paper Company machine could not have exceeded two or three inches and that whatever pitch there was must have operated in direct opposition to the Eibel principle (Appendix, p. 225).

At to the vital question whether the prior art showed any Fourdrinier machine with a wire pitch used for the purpose of producing speed equality between stock and wire, and adequate in extent to be of any material advantage in increasing the speed of the machine, the Court of Appeals for the First Circuit did not find "it necessary to review in detail the great mass of evidence concerning prior uses, for, in the view we take of the case, the plaintiff's own admissions as to the nature and extent of 4 or 5 inches prior uses conclude the point in the defendant's favor" (Pamphlet, p. 55; 274 Fed. 551). (In fact we have always denied that any pitch greater than

3 inches was proved prior to Eibel as fully stated above.) But the Court thinks that the prior operators "*must*" "have observed the action of the stock on the wire at different rates of gravity-induced speed" (Pamphlet, p. 61; 274 Fed. 555); says that "the direct and affirmative evidence shows that there was prior appreciation of the principle which Eibel now claims as his own discovery" (Pamphlet, p. 60; 274 Fed. 555) without mentioning in any way what particular evidence the Court has in mind; and waves aside the point that the prior use adjustments "were adopted for drainage purposes only" by the statement that "so contending plaintiff's argument falls little short of claiming an absolute monopoly for Eibel of the use of gravity through pitch", whereas "long before Eibel people knew that water would run down-hill and that the steeper the hill the faster the water would run"; and that "moreover drainage depends in part upon speed, and paper makers *must* have observed the relation, whether running the stock uphill or downhill" (Pamphlet, p. 59; 274 Fed. 554).

We submit, with all deference, that this is no answer at all to the proven facts that the drainage adjustments not only involved no appreciation of the Eibel principle whatever, but were in fact, when used at all, almost always used in diametrical opposition to the Eibel principle; and that the fact that the Court *thinks* the users of these adjustments *must* have observed the Eibel principle because they knew that water runs downhill, does not alter the facts (a) that the most skilled workers in the art—the patentees, gave no hint of any such appreciation or (b) that no one ever did learn from the drainage adjustments that by putting in a high pitch and speeding up his wire he could get the increased production that he was so ardently desiring, until Eibel showed him that greatly increased production could be obtained in that way, whereupon they all, with one accord, jumped at the idea.

CHAPTER IV.

INFRINGEMENT.

The significant facts as to defendant's machines are:

(a) The *pitch* of the wires is approximately *14 inches.* The pitch extends from breast-roll to guide-roll and is obtained by blocks placed under the supports for the machine at the breast-roll end.

(b) The *head* carried on the machines, *i. e.,* the depth of the pond of stock back of the slices, is *7 inches or more.*

(c) The *wire speed* is about *550 feet per minute.* (The wire speed is about 8 per cent less than the *paper* speed, which is 600 feet per minute, since the paper stretches about this amount while being drawn through the presses and calenders Rec. p. 31; p. 49, XQ. 101; p. 119, Qs. 6–10, 18; p. 911.)

The above figures are those shown by defendant's expert Carter in his Diagram No. 2 (p. 163 following p. 1092 of the record) as illustrating "Defendant's machines operating as per plaintiff's testimony".

In Carter's Diagram No. 3, purporting to illustrate these machines as seen by Carter in November, 1917 (about a year after the bill was filed) (Rec. p. 936, XQ. 161), he assumes the pitch to be 13½ inches (instead of 14), the head 6 inches (instead of 7 or more), and the wire speed 585 feet per minute (instead of 550 feet per minute). The variations between these two sets of data are really of little consequence on the question of infringement, and the Court of Appeals for the First Circuit assumes the correctness of the plaintiff's figures on the matter (Pamphlet, p. 51; 274 Fed. 549). It therefore

seems unnecessary to discuss the evidence on the point,* it being remembered that there is no dispute that the conditions on the machines prior to the filing of the bill were substantially as set out above.

All the witnesses agree that even at the high speeds at which these machines are run, the sheet smoothes out to a smooth, glassy surface early on the wire (Gray, p. 10; Devine, p. 242, XQs. 153–155; Beyerl, p. 275, XQ. 308), the point of complete smoothing out and speed equality occurring about 9 or 10 feet from the slice (Aldrich, p. 31; Carter, pp. 900, 925). All deleterious waves and ripples are therefore eliminated before the critical point of active paper formation, and the result is that a good sheet of paper is made at high speeds.

Only by reason of the high pitch at which these machines are run is their high speed possible. No one claims that without a substantial pitch they could run at anything like such speeds.

These machines are in all respects, except the pitching of the wires, the same as those in common use prior to Eibel's invention, being as shown in Savery patent No. 742,239, of 1903 (Rec. p. 1052). Yet they make paper 100 to 150 feet per minute faster than any machines prior to Eibel had ever been able to operate continuously, and as we have seen, defendant has admitted that if it were to lower its wires to the horizontal, two more machines would have to be built to do the work which its

* As to the pitch, see Gray, Rec. p. 9; Barlow, Rec. p. 226, XQ. 69, and Defendant's Exhibit E (lower half), record p. 131 following p. 1084.

As to the head, see Gray, Rec. p. 9; Devine, Rec. p. 237, Q. 83; Aldrich, p. 119, Q. 4; and Haddock, p. 95, Qs. 41-45.

As to wire speed, see Gray, Rec. p. 9; Aldrich, p. 31; Devine, p. 236, Q. 63.

present four machines with pitched wires now accomplish (*supra*, pp. 8, 9).

DEFENDANT'S MACHINES EMPLOY THE EIBEL INVENTION AND INFRINGE THE CLAIMS.

Defendant's pitch of 14 inches is obviously a substantial pitch within the meaning of the patent, since it is practically the same as that shown on Eibel's drawing (in fact, it is an inch or two higher), the patent drawing indicating a pitch of about 12 or 13 inches for a wire or ordinary length (Rec. p. 23). Being the same pitch shown in the patent, it naturally results, like the pitch of the patent, in causing the stock to travel "by gravity, rapidly" in the direction of the movement of the wire, and since the wire on these machines travels at a speed of 550 feet per minute and the stock enters upon the wire at speeds of only 350 feet per minute or thereabout (which is admittedly the initial speed that the head of 7 inches will cause; Rec. p. 31), the pitch is a necessary agent in overcoming the initial difference of speed between stock and wire and causing the stock to travel "at a speed approximately equal to the speed of the wire". (See Aldrich, pp. 31, 32.) "Drag" alone is wholly insufficient to overcome any such initial difference of velocity between stock and wire as 200 per minute without great commotion in the sheet, resulting in bad paper. As all witnesses agree (Aldrich, p. 31; Carter, pp. 900, 925), speed equality is brought about in defendant's machines at a point about 9 or 10 feet down the wire, and thereafter the stock travels at the same speed as the wire; and as all the witnesses also agree, by reason of this speed equality there are no waves or ripples on the wire during the critical period of formation, a smooth glassy surface being formed, and the resulting sheet of paper is well

formed and even. (Gray, p. 10; Devine, p. 242, XQs. 153–155; Beyerl, p. 275, XQ. 308.)

The defendant's machines and their mode of operation are an appropriation of the whole substance of the Eibel invention.

Comparing the defendant's machines with claim 1 of the patent it will be seen that each of them is, in the language of the claim, "a Fourdrinier machine having the breast-roll end of the papermaking wire maintained at a substantial elevation above the level, whereby the stock is caused to travel by gravity, rapidly, in the direction of movement of the wire, and at a speed approximately equal to the speed of the wire, substantially as described" in the specification, defendant's elevation being as we have seen slightly greater than that illustrated in the drawing of the Eibel patent.

Referring to claim 2, it appears that each of the defendant's machines is a Fourdrinier machine having the breast-roll end of the paper-making wire maintained at a high elevation, whereby the stock is caused to travel by gravity faster than the normal speed of the wire for the grade of stock on which the machine runs, to wit, newspaper stock. When Eibel here refers to "the normal speed of the wire" he means the normal speed at which the grade of stock was run on the horizontal wire in use at the time of his invention, and that normal speed was approximately 450 feet per minute paper speed, or approximately 405 feet per minute wire speed (see Aldrich, p. 33), or less, this being about the upper limit of speed at which news paper of standard grade could be made upon average machines. The high elevation of the wire in the defendant's machines causes the stock to travel by gravity much faster than this "normal speed" (namely, at 550 feet per minute); and the machines have, in the

language of the claim, "means for increasing the speed of the machine to cause the wire to travel at substantially the same rate of speed as the rapidly-moving stock". This means consists, as in the Remington-Martin Company's machines, of the governor on the engine, which controls the speed at which the engine drives the wire, enabling the defendant to increase its speed so that the wire travels at substantially the same rate of speed as the stock.

Claim 3 is the same as claim 1, except that it contains the specific provision that the wire shall be declined from the breast-roll to the guide-roll, a feature which, as we have seen, is present in the defendant's machines. What was said above as to infringement of claim 1 applies equally to claim 3.

Claim 7, in addition to specifying that the paper-making wire shall be declined from the breast-roll to the guide-roll, requires that the suction boxes be supported at a corresponding declination, and claim 8 is the same as claim 7, except that it uses the language "the several suction boxes arranged at different elevations, substantially as described", instead of the language "the suction boxes supported at a corresponding declination, substantially as described" of claim 7. The defendant's machines embody this feature (see Defts. Ex. A following p. 1084 and Gray, Rec. p. 10), and therefore fall within the requirements of claims 7 and 8.

Referring to claim 12, it appears that each of the defendant's machines has a downwardly moving paper-making wire, the declination and speed of which are so regulated that the velocity of the stock down the declining wire, caused by gravity, is so related to the velocity of the wire in the same direction that waves and ripples on the stock are substantially avoided, and the fibres are deposited with substantial uniformity on the wire.

DEFENDANT'S No. 2 MACHINE.

Since the bill of complaint was filed, and solely for purposes having to do with this litigation, the defendant reduced the pitch on its No. 2 machine from 14 inches to about 6 inches; to be precise, the pitch is now 6¼ inches (Rec. p. 287, XQs. 499, 500; p. 226 XQ. 68).

The question whether the 6-inch pitch on the No. 2 machine is an infringement or not is not relevant at the present stage of the case, since it was not used by the defendant until after the bill of complaint was filed, and Judge Hale did not pass upon it, remarking (Pamphlet, p. 33; 267 Fed. 855) that in the present aspect of the case he thought it unnecessary to decide the question of infringement by the No. 2 machine.

Yet the principal discussion of the Circuit Court of Appeals for the First Circuit centers about this No. 2 machine with the 6-inch pitch. Because that Court did not think that a 6-inch pitch differed except as a slight matter of degree from the prior art drainage adjustments, which the Court erroneously says we conceded to have been as much as 4 or 5 inches (whereas in fact they are not shown ever to have exceeded 2 or 3 inches), and because we contend that the Eibel invention is used even on this modified Defendant's No. 2 machine, the Court finds no difference in principle between the prior art and Eibel. *The Court pays very little attention to the fact that all four of the defendant's machines had 14-inch pitches up to the time of the filing of the bill, and that the other three of them still retain that 14-inch pitch; and that no one could possibly contend that a 14-inch pitch is the same sort of thing as the drainage adjustments of the prior art.*

We have contended and now contend that the Eibel

invention is employed (although not in ideal form) in this No. 2 machine of the defendant as modified, not for the mere reason that that machine has a 6-inch pitch (which the Court of Appeals seems to assume our position to be), but *because it uses that pitch in accordance with the Eibel principle,* as a means of speeding up the stock on the wire to speed equality with the wire, and thus enabling it to run the wire at greater speed than would be otherwise possible.

To compensate for the lower pitch which it now uses on this machine, the defendant uses a higher head than that on the other machines, so as to get a greater initial stock speed (Devine, Rec. p. 237, Q. 84; pp. 242, 243, XQs. 157, 158. Haddock, Rec. p. 95, Q. 46); and it also uses more water in the stock on this machine than on the others (Rec. p. 238, XQs. 100, 101; p. 262, Q. 109). But, even so, this 6-inch pitch is not adequate to get the best results, for, as Mr. Carter found, speed equality between stock and wire is only reached on this machine at a point a foot or two farther down the wire than on the other machines (Rec. p. 900, Q. 38), and the paper produced is admitted by defendant's witnesses to be somewhat "wild" (Devine, Rec. p. 237, XQ. 87; Lavalle, Rec. p. 251, Qs. 95–97; Beyerl, Rec. p. 274, XQs. 299, 300; Haddock, Rec. p. 96, Q. 50).

The universal testimony of all witnesses in the case testifying on the subject (with the single exception of defendant's patent expert Carter, who doesn't "pretend to be posted in paper making"; Rec. p. 924, XQ. 108), is that the practically advantageous range of pitches for use in accordance with the Eibel principle begins with pitches of 6 inches or thereabouts, and that such a pitch is of a different order from the drainage adjustment of the prior art and may properly be called substantial. (We

have summarized this testimony below in connection with our discussion of the question of indefiniteness of claims; *infra*, pp. 137–9). Our position with reference to the No. 2 machine equipped with the 6-inch pitch is, therefore, that since this machine is operated in accordance with the Eibel principle—that is to say, since its pitch is so co-related to the wire speed and other conditions prevailing on the machine that it tends to produce speed equality between stock and wire; doing away with commotion on the stock and enabling higher speeds to be maintained—it is an embodiment, though not an ideal embodiment, of the Eibel invention.* Such a pitch so used in accordance with the Eibel principle is an absolutely different thing from the prior art drainage adjustments, not merely because it is of a different order of magnitude, being twice as great as any of the prior art drainage adjustments ever were, but, what is more important, because it is used in accordance with the principle of operation which was new with Eibel, and which never was utilized in connection with the drainage adjustments.

But we protest that if we are wrong in this contention and if a 6-inch pitch is not a substantial pitch within the fair meaning of the Eibel patent, still the validity of Eibel's patent to cover the 14-inch pitches, which are the only ones properly in issue in the case, ought not to be determined adversely to the patent because we, in the record and in argument, have erroneously claimed for the patent more than it properly covers. No one, not even

* Infringement is not avoided merely because a defendant does not utilize the advantages of an invention to its fullest extent.

Winans v. *Denmead*, 15 How. 330, 344;
Telescope Co. v. *Gold Co.*, 229 Fed. 1002, 1004;
American Co. v. *Finch*, 239 Fed. 885, 890;
Van Kannell Co. v. *Strauss*, 235 Fed. 135, 137.

defendant's expert Carter, pretends to deny that a 14-inch pitch is a substantial pitch, judged by any test whatever.

The 6-Inch Pitch on the No. 2 Machine is a Temporary Expedient Adopted Only for the Purposes of this Case and to be Abandoned as Soon as the Exigency Passes.

The drop of the wire on the No. 2 machine from 14 inches to 6 inches was made under instructions from defendant's counsel, Mr. Paul (Rec. p. 229, XQs. 133, 134), *"on account of an infringement of the Eibel patent"* (Rec. p. 227, XQ. 97). "They were fighting a case" (Rec. p. 82, Q. 36). Defendant's superintendent Devine says that "they" (presumably defendant's president and defendant's counsel) "wanted me to put them flat" (Rec. p. 240, XQ. 129), but that he, Devine, *"didn't want to get up against it that way"*. That is, he did not dare to reduce the wire to the level, or to the 2 or 3-inch pitch of the old drainage adjustments and so left a 6-inch pitch on the No. 2, and did not change the others at all. This reduction in the pitch was made on April 8, 1917 (Rec. p. 229, XQ. 125), while a motion for preliminary injunction was pending.

This was the status of the machine at the time defendant's testimony was taken, and we find defendant's witnesses in that testimony cheerfully telling how good the paper made on the No. 2 machine was and saying that it was just as good as that made upon the other machines. Thus, Beyerl said (Rec. p. 263, Qs. 123, 124) that "there is no substantial difference" between the paper made upon the two machines and that the paper made on all the machines "looks alike to me".

But just as soon as word was received at International Falls that the Court of Appeals for the First Circuit had

suspended the preliminary injunction as to these machines, *up went the wire again on this No. 2 machine to its original 14 inches.* That decision came down about June 1, 1917, and in July, 1917, Haddock, defendant's foreman, raised the breast-roll back again to its original 14 inches because, as he says, he thought he could make better paper at the higher level than at the lower level (Rec. p. 93, Qs. 18–25). Haddock denies that the status of this case had anything to do with the raising of the wire (Rec. p. 93, Qs. 26, 27), but defendant's machine tender LeValley lets the cat out of the bag by saying that *it was supposed they had won the case and that was the reason for raising it up again.* He says (Rec. p. 83, Q. 41):—

> "They said that Eibel was fighting this case through; that they had to lower the pitch down at once; they lowered it down; then I supposed that they had won the case,—was the reason for raising it up again.
>
> *Q.* 42. That was the common talk around there?
>
> *A.* Yes."

But the case had not been finally won, and as soon as counsel for defendant learned of this indiscretion, down went the wire a second time to 6 inches. Haddock, the foreman, says that it was dropped because "they [the head office] ordered it dropped" and that they did not consult him about it at all (Rec. p. 94, Qs. 32–34).

> "*Q.* 36. Did they say that had anything to do with this Eibel case?
>
> *A.* Well, of course I can't say that they said anything like that, but of course I thought perhaps it did."

Although defendant's witnesses say that the paper

made upon the No. 2 machine is "just as good" as that made upon the other machines, we are compelled to infer from this conduct that it is *not*, and that if the exigencies of this case would allow, the pitch would be raised again to 14 inches.

DEFENDANT'S FALLACIOUS ARGUMENT ON INFRINGEMENT.

Defendant denies infringement, and although the Circuit Court of Appeals for the First Circuit does not definitely so hold, it appears to agree with this position, for it says in summarizing its conclusions (Pamphlet, p. 61; 274 Fed. 555, 556) that:—

> "If we construe the language of the patent according to its natural import as claiming pitch sufficient to eliminate drag, there was no useful invention, and no infringement even if there was invention."

In this sentence a fundamental fault of the argument for non-infringement is suggested. *The finding of no infringement depends upon a construction of the patent such as to make it cover "no useful invention".*

Such a result certainly raises instantly a grave question whether the Court has really read the claims according to their *"natural import"*. There is a strong presumption that at least the inventor *intended* to cover some "useful invention" in his claims; and there is also a cardinal principle of law, applicable not only to claims of patents but to the construction of all written instruments that in case of ambiguity, that construction which gives life to the instrument shall be adopted, rather than that which renders it nugatory.

The argument for non-infringement seems to us thoroughly fallacious, and its fallacy appears to us to have

been completely demolished by the logic of the opinion of the District Court (Pamphlet, pp. 31, 32; 267 Fed. 854, 855).

Briefly stated, defendant's position is substantially this:—that the Eibel patent contemplated doing away entirely both with any "head" (due to the depth of the pond of stock back of the slice, which "head" gives the stock its initial speed as it enters upon the wire), and with any "drag" or friction of the wire on the stock, and relying upon pitch on the wire *alone* as the *sole* means of accelerating the stock to speed equality with the wire. Prior to Eibel, stock on paper machines had been brought up to wire speed by the first-named two factors, alone, the "head" of the pond of stock giving the stock an initial speed as it entered upon the wire, and the "drag" of the wire accelerating the stock from that initial speed up to the greater wire speed. Defendant's argument is based on the premise that Eibel contemplated doing away entirely with these two factors, head and drag, and using gravity action due to pitch of the wire as the sole means of accelerating the stock to wire speed.

Thus, defendant's expert Mr. Carter says:—

> "I regard it as clear from the patent that Eibel contemplates a condition in which the stock is supplied at as nearly no head at all, *i. e.*, as nearly zero velocity, as can be attained in practice." (Rec. p. 895, Q. 27.)

And again he says (Rec. p. 897, Q. 32):—

> "Yes, it is my understanding of the Eibel patent that in any installation of paper making machines following this patent *the friction or drag of the wire would be done away with entirely.* The Eibel

patent proposes to eliminate the friction or drag of the wire on the stock, and to depend solely upon the pitch of the wire to bring about the necessary acceleration of the stock to the speed of the wire."

The Court of Appeals does not go quite so far as defendant's expert, because it "assumes, as plaintiff's counsel contends, that the machine would hardly be expected to operate without any *head* at all" (Pamphlet, p. 49; 274 Fed. 548); but it does think that construing the language of the patent "according to its natural import" the pitch must be "*sufficient to eliminate drag*" (Pamphlet, p. 61; 274 Fed. 555).

Taking this view of the scope of the claims, the Court of Appeals quotes at Pamphlet, p. 52, 274 Fed. 550, certain mathematical computations produced by defendanf's expert Carter which state that, with the defendant's machines operating in accordance with plaintiff's testimony, the velocity imparted to the stock by the pitch is 130 feet per minute, while that imparted by drag is 70 feet per minute, and both are considerably less than the initial velocity due to head which is 350 feet per minute. It thus appearing that drag is not eliminated in the defendant's machines, the Court of Appeals concludes that there is no infringement.

The second table quoted by the Court from defendant's expert Carter, purporting to show the effects on the machines "as operated according to the defendant's testimony", *i. e.*, as observed by Carter about a year after the filing of the bill, indicate that the velocity due to pitch was 118 feet and the velocity due to drag 137 feet.

Before coming to a detailed consideration of these calculations of Carter, we shall first show the unsoundness of the construction of the claims contended for by the de-

fendant and adopted by the Court of Appeals, which limits them to the use of a pitch such as to eliminate drag.

EIBEL DID NOT CONTEMPLATE DOING AWAY WITH EITHER HEAD OR DRAG, BUT ADDED A NEW FACTOR, PITCH ON THE WIRE, TO BE SUPERIMPOSED UPON AND TO CO-OPERATE WITH THE OTHER FACTORS.

Nothing could be more absurd than the proposition advanced by Mr. Carter that the Eibel patent contemplates no head at all, or that it is infringed only when the minimum possible head necessary for operation is used. The Eibel principle begins to operate only *after the stock has entered upon the wire,* and for Eibel's purposes it makes no difference whether the stock has a high initial velocity or a low initial velocity, *the only important question being what the difference in velocity is between the stock as it enters upon the wire and the wire speed,* and whether gravity due to a substantial pitch on the wire is called into play as a material factor in overcoming that initial difference of velocity between stock and wire and bringing the stock up to speed equality with the wire. As Mr. Aldrich says, it is immaterial for Eibel's purposes what head is employed, except that upon the head depends the amount of pitch which is necessary; other things being equal, the smaller the head the higher the pitch that is required and the higher the head the smaller the required pitch (Rec. p. 122, Q. 22). There is not a word in the Eibel patent to support Mr. Carter's view or to indicate that Eibel contemplated using any different head than that which was ordinarily used in the art at the time; and defendant's other expert, Mr. Livermore, upon cross-examination, definitely agrees with this view.

Mr. Livermore was asked (Rec. p. 979, XQ. 45) :—

"Do you understand that the Eibel patent contemplates the use of no head at all, or of a minimum head, or of the ordinary head such as was in common use at his date?

A. In view of the silence of the patent on this point and of the reference to what has been done in the art contained in the patent as a basis for explaining the alleged improvement of the patent, *my judgment would be that it would naturally be assumed that the stock was delivered from the flow-box on to the wire in the way in which it had usually been done prior to the time of the Eibel patent.* . . .

"*X-Q.* 46. Is it not a reasonable interpretation of the patent to consider that Eibel was dealing with the problem of increasing the velocity of stock on the wire from the velocity at which it entered upon the wire, which is less than that of the wire, to a velocity equal to the velocity of the wire?

A. Yes, I think so. That is what I naturally understood from the patent itself and from the explanation of the patent and prior art given by Mr. Aldrich, which I also read in order to get as full an understanding of the subject as possible."

"*X-Q.* 49. What I mean to ask is whether, in your understanding of the disclosure of the Eibel patent, you view it as limited in application to some specific head, or whether, on the contrary, it is not equally applicable to a machine running under varying degrees of head?

A. I should not understand that it was limited to any one specific head, or even to the minimum attainable head."

"*X-Q.* 52. Then, ought not one, in considering

whether the pitch of the wire in any given installation is that which Eibel proposes, to consider only the relative velocity between the stock and wire when the stock issues upon the wire and the effect that pitch has thereafter in accelerating the stock to speed with the wire, and to disregard the matter of head except in so far as it determines that initial speed?

A. I think so."

After this testimony of Mr. Livermore, there is obviously nothing left in this branch of Carter's contention, as to eliminating "*head*", and, indeed, this view was not adopted by the Court of Appeals for the First Circuit.

Defendant's proposition that Eibel intended to do away entirely with the friction or "drag" of the wire, which the Court of Appeals does adopt, is equally impossible. *One can no more do away with the friction between the stock and the wire, where a difference of speed exists between the two, than he can sweep back the sea with a broom.* Friction is inevitable and necessary, as of course Carter had to admit on cross-examination. He says (Rec. p. 942, XQ. 184) :—

> *"If by this you mean to ask me whether it is practicable in high speed machines for making news to eliminate the drag of the wire entirely, I should say that it is not."*

Carter's theory about Eibel's intent is based upon his view that *"Eibel's comprehension of the problem involved was so limited that he might easily have failed to understand that he could not eliminate the drag of the wire entirely, and still be in his right mind"* (XQ. 186).

We submit that it is Carter, and not Eibel, whose com-

prehension of the problem was so limited. Yet the Court of Appeals adopts Carter's view.

Since it is inevitable that there shall be friction or drag between a wire traveling at one speed and stock traveling at a different speed on the wire, it is likewise inevitable that that friction or drag shall act to accelerate the stock toward the speed of the wire when the wire is running faster than the stock. This also Carter is compelled to admit (Rec. p. 942, XQ. 185).

Eibel did not then intend, and could not possibly have intended, to do what Carter says he intended to do, namely, cause the pitch to be the sole factor in accelerating the stock to speed equality with the wire, doing away with the effect of drag altogether. *In fact, it is necessary to the operativeness of a pitched wire not only that drag be present but that by the time speed equality has been brought about between stock and wire, drag be dominant over gravity, since otherwise when the point of speed equality had been reached, gravity would cause the stock to continue to accelerate and to exceed the speed of the wire, thereby causing the very trouble which it is Eibel's purpose to eliminate.* In an Eibel installation it is only because drag has become the controlling force (due to the increasing viscosity of the stock) by the time speed equality between stock and wire has been reached, that the stock does not overspeed the wire. After the stock has once equalled the speed of the wire, drag prevents it from thereafter going faster than the wire.

Carter's theory on this point likewise is exploded by defendant's other expert witness, Livermore, who says (Rec. p. 988, XQ. 77):—

"Regardless of what you think Eibel himself may

or may not have contemplated in this respect, do you think that the subject-matter of his patent and claims is embodied only in a machine in which drag is entirely eliminated as a factor in accelerating the stock?

A. No, in that event the subject-matter of the patent could not be embodied in any machine."

The true view is obviously that stated by Judge Hale in his opinion (Pamphlet, pp. 31, 32; 267 Fed. 855), namely, that the new factor which Eibel introduced into the operation of the paper machine, *i. e.*, a gravity feed, causing a rapid acceleration of stock on the wire due to a substantial downhill pitch on the wire, was to constitute an *additional* accelerating means, to be *superimposed upon* and *added to* whatever stock accelerating factors there were already in use on the machine, namely, head and drag. As Judge Hale well says (Pamphlet, p. 31; 267 Fed. 855):—

> "Eibel's one object was to arrange a process by which the machine could be run at a much higher speed than heretofore. . . . To produce this result he used gravity. **He used also the elements which he found at hand; namely, the 'drag' and the 'head' due to the depth of the 'pond' back of the 'slice'. His effort was to get speed; he did not wish to abolish or disregard any of the elements which helped him to get speed.**"

And again, as Judge Hale says at Pamphlet, p. 32; 267 Fed. 855:—

> "Eibel introduced a new speed making factor. He proposed to bring the speed of the stock up to the speed of the wire; to use gravity to that end; but *I cannot hold that he contemplated that gravity*

should be used to the exclusion of the other elements which were already in use. He found those elements at work; there is no reason why he should exclude them from helping along the work. The process invented by him begins to operate after the stock has entered upon the wire. His apparent attempt was to get rid of bubbles and wrinkles before he got to the place on the machine where paper is formed. To do this he allowed gravity to work with 'drag' and with 'head'. He *harnessed all the elements he could find. He brought gravity in with the other elements;* and so brought the speed of the stock up to equality with that of the wire. By this means he achieved high speed, and also freed the stock on the wire from waves and ripples."

In the passages quoted, Judge Hale clearly and pointedly stated what is, we submit, the only reasonably possible view of Eibel's invention, and completely demolished the specious position of defendant.

Let us now specifically answer the arguments advanced for the construction of the claims adopted by the Court of Appeals for the First Circuit.

1. Defendant's Interpretation of Eibel's Claims is Not Supported by the Specification. On the Contrary, such an Interpretation Would Mean that the Drawing of the Patent Itself Does not Disclose the Invention, and that the Invention was never used by Eibel or Any One Else Anywhere.

Defendant first argues that the specification of the Eibel patent itself shows that the invention is limited to a machine or process in which the pitch on the wire alone, to the exclusion of other factors, accelerates the stock to speed equality with the wire, and the Court of

Appeals quotes at great length from the specification and claims, italicizing passages therein, from which it concludes that:—

> "If Eibel did not mean such pitch as would practically eliminate drag, in eighteen places the language used requires a strained and unnatural construction." (Pamphlet, p. 44; 274 Fed. 545.)

The point made by the Court of Appeals is that in his patent Eibel does not specifically refer to any other speed-producing factor than gravity due to pitch on the wire as a force which aids in causing the stock "to move approximately or substantially as fast as the wire moves." (Pamphlet, pp. 42, 43; 274 Fed. 544). A typical illustration of the passages from the specification and claims referred to by the Court is that from p. 1 of the patent, lines 16–23, which reads as follows:—

> "My invention . . . consists in causing the stock to travel by gravity in the direction of movement of the making wire and approximately as fast as the making wire moves, thereby resulting in a 'gravity feed' for the machine."

Such passages fall very far short of asserting that gravity *alone* must bring the speed of the stock up to the speed of the making wire. They are just as susceptible of the interpretation that gravity, when superimposed upon and working with the other factors in use on the machines prior to Eibel's invention, should bring the stock up to speed equality with the making wire. Eibel was naturally emphasizing the new accelerating factor which he had supplied to the machine, and he took for granted the presence on the machine of the speed-giving factors already in use. As Judge Hale said:

"His effort was to get speed; he did not wish to abolish or disregard any of the elements which helped him to get speed." (Pamphlet, p. 32; 267 Fed. 855.)

A complete answer to the contention that the specification of the patent compels the claims to be construed in such a way as to limit them to the use of a pitch which by itself alone, to the exclusion of head or drag, accelerates the stock to speed equality with the wire, is the fact that such a construction leads to the preposterous conclusion that *the drawing of the Eibel patent itself does not disclose a machine embodying Eibel's invention, as applied to the manufacture of news or any paper at speeds of 400 feet or upward.* This defendant's expert Mr. Carter definitely admits. He says that in order to embody his idea of Eibel's patent a pitch of at least 48 inches would be necessary (Rec. p. 892), and the Court of Appeals accepts his statement (Pamphlet, p. 43; 274 Fed. 545), whereas the drawing of the patent admittedly shows a pitch of only 12 to 13 inches (Rec. p. 23). We quote Carter's testimony (Rec. p. 941):—

"*X-Q.* 181. Does the machine illustrated in the drawings of the Eibel patent embody the Eibel invention, as you understand it, on the assumption that it is designed to provide increased speed of paper?

A. If applied to machines running slow enough and under low enough head, it might perhaps be. *If considered as applied to the manufacture of news or any paper at speeds of 400 and upward, my answer is no,* the pitch here shown is not sufficient to give to the action of gravity due to the pitch of the

wire enough predominating influence in the acceleration of the stock to the speed of the wire."

Yet the whole purpose stated throughout the Eibel patent is to get increased speeds over those then prevailing, which, as we have seen, were commonly 400 to 450 feet per minute (*supra*, p. 56). Eibel says (patent, p. 1, lines 10–13) :—

> "This invention . . . has for its object to construct and arrange the machine whereby it may be run *at a very much higher speed than heretofore.*"

In fact, in answer to XQ. 180, Rec. page 941, Carter expressly admits that Eibel *"evidently contemplated higher speeds than 400 feet"*.

Evidently there is something wrong with a view of the patent which reads out from its scope the very machine shown in the drawing of the patent when operated at the speeds contemplated by the patent.

Also, if defendant's position as to the meaning of the claims were adopted, it would follow, as defendant's expert Mr. Carter admits, *that Eibel never even embodied his invention on his own machines at the Rhinelander Paper Company,* where he first originated and put his idea into use, and from which the idea spread through the industry. We quote Mr. Carter's statement (Rec. p. 919) :—

> "*X-Q.* 86. It has been testified in this case that, following the making of his invention, Eibel organized the machines at the Rhinelander Paper Company, of which he was superintendent, in such a way that they had a pitch of about 14 inches and ran at a speed of between 500 and 600 feet per minute. *Is it your position that that arrangement*

and mode of operation did not embody the invention described in the claims of the Eibel patent?

A. Certainly it did not."

Yet these Rhinelander machines were the very ones upon which the drawings of the patent were based, and which gave their name to the "Rhinelander scheme", which has revolutionized the art.

Finally, defendant's position leads to the conclusion that the Eibel invention as set forth in the patent *has never been put to practical use by anyone, anywhere.* Mr. Carter expressly admits this in answer to XQ. 85, Rec. p. 919, as follows:—

> "According to your understanding, then, the invention which the Eibel patent purports to describe has never been put into practical use by anybody?
>
> *A. So far as I know, the arrangement and mode of operation set forth in the Eibel patent in suit have never been put in practical use by anybody.* The various installations which have been called Eibel installations can readily be shown, on analysis, to fall far short of accord with the disclosure of the Eibel patent in what I regard as the gist of his alleged new principle of operation, to-wit, the running of the wire on a pitch such as to bring about the acceleration of the stock solely by gravity due to the pitch of the wire, eliminating drag completely, and regardless of head, which is intentionally maintained at the lowest possible limit."

It seems to us to be putting the matter mildly to characterize any argument that leads to the conclusion that the Eibel patent was not used at Rhinelander, has never been used by any one of all the numerous licensees who have for many years been paying royalty to the

plaintiff for licenses under the patent, and is not even embodied in the very drawing of the patent when the machine is used for the purpose set forth in the specification, as *preposterous.*

2. *The Decision of the Court of Appeals in the Remington-Martin Case does not Support Defendant's Interpretation of the Claims, but, on the Contrary, is Wholly Inconsistent Therewith.*

The Court of Appeals for the First Circuit in this case says that "the defendant contends, not without plausibility, that the decision of the Court of Appeals for the Second Circuit, construed in connection with the record now before this Court, makes that decision an authority for the defendant and not for the plaintiff" (Pamphlet, p. 56; 274 Fed. 552). (This, although the Court had in the next preceding paragraph said that "we do not think that we can properly follow that decision".)

The fact is that if the Court of Appeals for the Second Circuit in the Remington-Martin case had taken the view of the Eibel claims for which defendant contends, *it could not possibly have found that the Remington-Martin machines infringed.* As we have seen, a pitch of 48 inches is the lowest pitch which defendant's expert Carter, and the Court of Appeals for the First Circuit, following him (Pamphlet, p. 43; 274 Fed. 545) assert could be employed in any machine that was an embodiment of Eibel's invention, whereas the Remington-Martin machines had pitches of only 18 and 20 inches, respectively (Pamphlet, p. 9; 234 Fed. 629). Figuring according to defendant's expert's method, the relative contribution to the ultimate stock speed, of pitch on the one hand and of head and drag on the other, in the Remington-Martin machines, it appears that the pitch on those

machines contributed only 194 feet to the speed of the stock, while the other factors contributed about 311 feet (Aldrich, p. 124, Q. 26), which, if defendant's argument were sound, would immediately read these machines out from the claims of the patent. Indeed, Mr. Carter admits that, under defendant's view of the claims, "the arrangement and mode of operation set forth in the Eibel patent in suit *have never been put in practical use by anybody*" (Rec. p. 919, XQ. 85); and the Court of Appeals for the First Circuit itself concludes that, construing the patent to require "pitch sufficient to eliminate drag, there was no useful invention", (Pamphlet, p. 61; 274 Fed. 555, 556), whereas the Court of Appeals for the Second Circuit said that the commercial success "of the invention has been wide and pronounced" (Pamphlet, p. 9; 234 Fed. 629).

Defendant, therefore, can find no support for its argument in the decision of the Court of Appeals for the Second Circuit in the Remington-Martin case. On the contrary, to adopt the construction of the claims adopted by the Court of Appeals for the First Circuit in this case is necessarily to reverse the decision in the Remington-Martin case.*

CARTER'S PERCENTAGE CALCULATIONS.

In an elaborate system of diagrams (Rec. pp. 161–169 following p. 1092) Mr. Carter purports to depict defendant's machines and the various prior use machines, and

*The Court of Appeals in the present case says (Pamphlet, p. 55, 274 Fed. 552) that "the plaintiff suggests, not apparently with much confidence, that this Court ought to follow the decision of the Court of Appeals for the Second Circuit in the *Remington-Martin Case*".

We were certainly unfortunate in our presentation of the case if we gave the impression that we lacked confidence in the correctness of the *Remington-Martin* decision, for we certainly had the reverse of that feeling.

calculates mathematically, upon the basis of the assumptions which he makes as to conditions on them, the proportions of the ultimate speed attained by the stock which are produced respectively by the three factors, head, pitch and drag, on these several machines.† Since he figures that in the defendant's machines important portions of the ultimate speed of the stock are due to the factors of head and drag, he concludes that the defendant's machines do not infringe the patent. In the alternative he figures that, if they infringe, the prior use machines anticipate.

We need not here say anything about the prior use calculations. We have elsewhere shown in this brief that in these "prior uses" such pitch as there was, was used merely for drainage, and usually in such a way as to increase instead of diminish speed difference between stock and wire, that in no case was there anything more than a trivial pitch of 2 or 3 inches proved to have been used prior to Eibel, and that no one prior to Eibel had the slightest conception or appreciation of his principle of operation. Mr. Carter's assumptions, upon which he bases his figures as to these prior uses, are in most instances wholly inconsistent with the facts proved in the case, the pitches assumed by him being much greater than are shown to have been used, and the heads and wire speeds being chosen by him to suit the purposes of his argument, without reference to facts. (See discussions of the prior uses in Appendix A.)

We need only consider Carter's mathematical argu-

† Defendant's brief in the court below said that these figures are "substantially uncontradicted." Let it be here emphatically noted that this is not true. Mr. Carter's figures involve assumptions that in most cases are absolutely unjustified by the evidence, and which are flatly contradicted as we show below.

ment as to defendant's machines, the substance of which appears in the two tables copied in the Court of Appeals' opinion (Pamphlet, p. 52; 274 Fed. 550).

Eibel was talking to practical machine tenders, to whom the mathematics involved in Carter's diagrams are just as much Greek as they are to Eibel himself. He told the machine-tender in plain terms to put a substantial pitch on his wire, as contrasted with the trivial drainage adjustments which had been previously used; and showed as an illustration in his drawings a pitch amounting to 12 or 13 inches for machines or ordinary type. He told these machine-tenders that, having put on this substantial pitch, they could then speed up their wires faster than they had been able to run before and that the pitch would give the stock a rapid gravity flow on the wire, which would accelerate the stock and bring it up to speed equality with the wire in time to prevent troublesome waves and ripples, and to enable good merchantable paper to be made at high speeds. Nothing was farther from his thoughts than to attempt nicely to determine by a system of mathematical computations just how many feet per minute would be contributed by drag and how many feet per minute by pitch, and how many feet per minute by head.

In an ideal Eibel installation the pitch will be such that gravity due to the pitch is the preponderating force in overcoming the initial difference of velocity between stock and wire, and only when the pitch is high enough so that this result is accomplished are the best results obtained. But one can depart widely from this ideal condition and yet get benefits of a very substantial kind from the pitch, provided only that he give his wire a substantial elevation, and use it to *overcome,* and not to

increase, an initial speed difference between stock and wire.

The question of preponderance as between the effect of pitch and that of drag is, moreover, not by any means determined by Mr. Carter's test. The important question is, what influences are acting upon the stock at early stages upon the wire? If the wire is to be run at high speed, it is vitally important that during these early stages the stock shall receive large acceleration, so that by the time it becomes viscous it shall have approached the condition of speed equality. With a flat wire there is no acceleration to speak of during the early stages on the wire, and it is only as the stock begins to thicken that drag takes hold materially, and then its effect increases rapidly, causing a rapid acceleration at the very point where it is desirable that quiescence shall have been attained. On the other hand, with a pitched wire the acceleration starts in at the very beginning, and by the time the stock becomes viscous the speed difference between stock and wire has been much reduced. If the question of infringement depended on "predominance", the thing to be decided would be whether pitch or drag predominate as an accelerating influence in the *early stages* on the wire; and it would not be a question of the relative contribution in feet per minute all the way up to the point of speed equality, which is what Carter's figures purport to show. (See Aldrich, Rec. pp. 123, 124.)

Moreover, if the question were to be considered mathematically, it would be necessary to ascertain what the thickness of the stock is at various points on the wire up to the point of speed equality, for of course all the water that drains through the wire between the slices and the point of speed equality has had to be accelerated

just as truly as the stock that remains on the wire when the point of speed equality is reached; and as a matter of fact, the volume of water draining through before the point of speed equality is reached is much greater than that remaining on the wire at the point of speed equality. If a mathematical test were to be adopted, it would be necessary to ascertain the amount of water draining through at the various stages on the wire, and to consider what accelerated this water, whether pitch or drag. Such measurements would be difficult in the extreme, but if made they would very likely show that the effect of drag upon this water lost by drainage on defendant's machines was negligible as compared with the effect of the pitch upon it. Mr. Carter makes no effort to determine this point.

Mr. Carter's percentage figurings are therefore wholly beside the point, from every point of view.

But even judged by Carter's test, in defendant's machines 130 feet acceleration is caused by the pitch and only 70 feet by drag. (See his figures quoted by the Court of Appeals at the top of Pamphlet, p. 52; 274 Fed. 550.) The acceleration due to pitch, therefore, greatly preponderates over that due to drag even when the effect of the two factors is computed in Mr. Carter's erroneous way.

In the second set of figures quoted by the Court of Appeals at Pamphlet, p. 52 (274 Fed. 550) Carter purports to show defendant's machines Nos. 1, 3 and 4 as he saw them operate in November, 1917 (Rec. p. 936, XQ. 161), and according to his calculations, he makes the velocity due to pitch 118 feet per minute and that due to drag 137 feet per minute. As we have said, it is immaterial what the precise ratio between those two factors is, so long as pitch is a substantial accelerating in-

fluence; but as a matter of fact, in this figuring Carter makes several false assumptions, all tending to increase the effect of drag and to decrease that of pitch.

He assumes a head of only 6 inches (see his Diagram No. 3, Rec. p. 163 following p. 1092), which is at least an inch lower than the normal average (Rec. p. 9; p. 119, Q. 4; p. 95, Q's 41–45); and he furthermore assumes a point of speed equality between stock and wire at the same distance down the wire as on his Diagram No. 2 (Rec. p. 163 following p. 1092, upon which he bases the first set of figures), where conditions were different. It is obvious that if with a head of 7 inches, a "net pitch" of 5 inches* and a wire speed of only 550 feet per minute (as assumed on Diagram No. 2) the stock catches up to the speed of the wire at a distance from the slice equal to one-third of the length of the wire, the point of speed equality will be farther down the wire in a machine in which there is a lower head (6 inches) and therefore a lower initial stock velocity, a slightly lower "net pitch" (4½ inches) and a faster traveling wire (585 feet). If, therefore, the assumption that speed equality is reached one-third the distance down the wire with the machines running in accordance with Diagram No. 2 is correct (as the evidence shows that it is), the assumption as to the point of speed equality between stock and wire on Diagram No. 3 is *not correct* (Aldrich Rec. pp. 125, 126, Q. 28). It should be considerably farther down the wire in the case of Diagram No. 3 than in case of Diagram No. 2. Carter admits that his determination of the point of speed equality was

* The "net pitch" figured on by Mr. Carter is the effective pitch up to the point of speed equality, which he assumes to occur one-third of the distance down the wire. The total pitch of the wire from breast-roll to guide-roll being about 14 inches, the "net pitch" is assumed by Mr. Carter to be one-third of this, or approximately 5 inches.

not precise and that it may have been as much as a couple of feet farther down the wire than he assumes (Rec. p. 926, Q. 118; p. 925, Q. 114; p. 906, Q. 50).

This point of speed equality between stock and wire is a material element in Carter's calculations, because after the point of speed equality on the wire is reached the pitch has no further utility, and therefore the extent of the effective pitch, or the "net pitch" as Mr. Carter calls it, depends upon the position of the point of speed equality. If, for example, the point of speed equality on Diagram No. 3 were only as much as one foot farther down the wire than that assumed by Carter (as it clearly would be if Diagram No. 2 is correct), the effect due to pitch, calculated in accordance with Mr. Carter's mathematics, would be 133 feet per minute, and that due to drag 127 feet per minute, instead of 118 feet per minute due to pitch and 137 feet per minute due to drag, as he figures,—this even assuming all the other conditions shown on Diagram No. 3. But in fact the head carried on these machines average at least 7 inches, and ordinarily near 8 (Rec. p. 9; p. 119, Q. 4; p. 95, Qs. 41–45); defendant's brief in the lower court said, p. 81, that this head was undoubtedly sometimes as high as 8 inches); and if a correction were made on this account, the effect of pitch would even more greatly preponderate over that of drag, even judged by Mr. Carter's test.

Mr. Aldrich, taking conditions upon the defendant's machines as he found them by actual measurement on September 15, 1919, and *using Carter's methods of computation throughout*, shows that, as they were then running, the *acceleration due to the pitch was 119 feet per minute* as against an acceleration of only *83 feet per minute due to drag* (Rec. pp. 120, 121, Q. 15).

But all such mathematical speculations are idle and

beside the point. Machine tenders are not interested in ascertaining by intricate mathematics just how many feet per minute are contributed by drag and how many feet per minute by pitch. The test of infringement is simpler than that, namely, *does the defendant use a substantial pitch (as contrasted with the prior art drainage adjustments), and does it use that pitch in order to call gravity into operation as an accelerating factor to speed the stock up to speed equality with the wire?*

That this is just what defendant does on all its machines is clear beyond question. It uses a pitch of approximately 14 inches, which is even higher than the 12 to 13 inches shown in the drawing of Eibel's patent, it uses this pitch in the manner and for the purpose stated in the patent, and it thereby gets speeds at least 25 per cent greater than it could get without the pitch (*supra*, pp. 8, 9).

The real effect of Carter's diagrams is very different from what Carter intended it to be, for the diagrams constitute an admission that the pitch on defendant's wires contributes at least 118 to 130 feet per minute to the speed of the stock; from which it follows that defendant by using the pitch is able to get at least 118 to 130 feet of paper per minute more than it could get with a flat wire, other conditions being the same.

PATENTS SHOULD BE CONSTRUED RATHER TO UPHOLD THAN TO DESTROY THE JUST RIGHTS OF THE INVENTOR.

By construing the Eibel claims in such a manner as to make them cover "no useful invention", not even the machine shown in Eibel's drawings, the Court of Appeals for the First Circuit violates the principle so thoroughly established by the decisions of this Court, that as between two possible constructions of a claim, that one should be adopted which will preserve rather than that one which will destroy the inventor's just rights to his real invention, *"ut res magis valeat quam pereat"*.

In the classic decision of *Winans* v. *Denmead*, 15 How. 338, 341, the Supreme Court said that an interpretation should not be put upon a patentee's claim which would make it cover less than his real invention, if it can fairly be construed otherwise, and this for two reasons:

> "(1) because the reasonable presumption is that, having a just right to cover and protect his whole invention, he intended to do so; (2) because specifications are to be construed liberally in accordance with the design of the Constitution and the patent laws of the United States to promote the progress of the useful arts and allow inventors to retain to their own use, not anything which is matter of common right, but what they themselves have created."

Again in *Corning* v. *Burden*, 15 How. 265, 269, the Court said that in case of an ambiguous claim the construction adopted "should be that which is most favorable to the patentee, *ut res magis valeat quam pereat*".

In *Turrill* v. *Railroad Co.*, 1 Wall. 491, 510, the Court again laid down the rule that patents "are to receive a liberal construction, and under the fair application of the rule *ut res magis valeat quam pereat*, are if practicable to be so interpreted as to uphold and not to destroy the right of the inventor".

In *Rubber Co.* v. *Goodyear*, 9 Wall. 788,795, the Supreme Court said:—

> "A patent should be construed in a liberal spirit to sustain the just claims of the inventor. This principle is not to be carried so far as to exclude what is in it or to interpolate anything which it does not contain. But *liberality rather than strictness should prevail where the fate of the patent is involved, and the question to be decided is whether the inventor shall hold or lose the fruits of his genius and his labors.*"

In *McClain* v. *Ortmayer*, 141 U. S. 419, 425, the Court said:—

> "In a case of doubt where the claim is fairly susceptible of two constructions, that one will be adopted which will preserve to the patentee his actual invention."

Particularly strong is the reason against adopting a construction of a patent such as to deprive it of all value, when the invention has been of great commercial utility, as is true of the Eibel invention to an almost unprecedented degree. In such a case a court, always reluctant to adopt a construction of the patent which will deprive an inventor of the benefit of his real invention, should be particularly liberal in its interpretation of the patent, as all the authorities properly hold. See, for example:

Mitchell v. *Ewart Mfg. Co.*, 81 Fed. 390, 391 (C. C. A. 3d)

Letson v. *Alaska Packers Ass'n*, 130 Fed. 129, 140 (C. C. A. 9th).

Electric Smelting Co. v. *Carborundum Co.*, 102 Fed. 618, 631 (C. C. A. 3d).

CHAPTER V.

THE ARGUMENTS AS TO "INDEFINITENESS", "DIFFERENCE OF DEGREE" AND FORM OF THE CLAIMS.

We have seen that a chief reason for the conclusion of the Court of Appeals for the First Circuit in this case, that Eibel's claims cover no useful invention and are not infringed, was that Court's view that unless the claims are limited to cover only machines in which a pitch sufficient to eliminate drag is employed, the claims are invalid because "they cover merely a degree and are void for indefiniteness" (Pamphlet, p. 62; 274 Fed. 555, 556).

In this chapter we propose to show that the claims, construed as the District Court in this case and as the Court of Appeals for the Second Circuit in the Remington-Martin case construed them, are neither void for indefiniteness nor as covering merely a difference in degree; and also to answer an incidental criticism by the Court of Appeals for the First Circuit of the form of Eibel's claims as regards the distinction between process and machine.

EIBEL'S CLAIMS DEFINE AN INVENTION DIFFERING IN PRINCIPLE OF OPERATION AND NOT MERELY IN DEGREE FROM THE PRIOR ART.

The Court of Appeals in this case says that the Eibel claims must be limited to a process or machine in which pitch does all the work of accelerating the stock to the wire speed, exclusive of "drag", because it says the prior art compels this construction if the claims are to be held valid. Specifically, the argument is that the prior art

used pitches of 2 or 3 inches (the Court wrongly asserts that we conceded that pitches of as much as 4 to 5 inches were previously used), and says that inasmuch as in these prior use machines gravity must have acted under the influence of the slight pitch to accelerate the stock, Eibel's claims calling for a substantial pitch differ from these prior art pitches only in degree, unless the claims are limited to the use of the pitch under such conditions that it alone, without any aid from drag, accelerates the stock to speed equality with the wire.

If it were true that the drainage adjustments prior to Eibel had embodied his principle of operation (though to a degree insufficient to get material advantages in the way of speed increases), and if it were true that all Eibel did was to show the art that great speed increases could be obtained by giving the wire a much steeper pitch, no new principle of operation being involved, still there would be good ground for sustaining his patent, since what he did was by no means obvious, as the history of the invention and of its reception by the industry recited above (pp. 31–36, 39–44) shows. The principle that mere obvious changes in degree are not patentable would not apply.

But Eibel's invention was by no means a mere departure in degree from what had been done by the prior users. His work, as the patent states, involved a *new principle of operation*, never even conceived of by the prior users, much less practiced by them. The prior users had used their 2 or 3 inch adjustments only as a means of drainage regulation, with no thought or conception of any relation between pitch and wire speed, and no foreshadowing of that correlation between pitch and wire speed which is the heart and essence of Eibel's invention. We have seen that even defendant's expert

Mr. Livermore agrees that the drainage adjustments had nothing in common with the theory of Eibel (Rec. p. 994, XQ. 94). and we have also seen (*supra*, pp. 82–85) that in practice such pitches as were used for drainage adjustment usually had exactly the opposite effect from that of an Eibel pitch, that is to say, they caused an *increase* rather than a *decrease* in the difference of velocity between stock and wire, because, in most instances where these adjustments were used, the stock was started on the wire at an initial speed as great as or greater than that of the wire, and therefore the effect of any pitch was to cause the stock to overrun the wire. If in any case it so happened that a drainage adjustment was used under such conditions that it did have a tendency to overcome an initial difference of speed between stock and wire, that effect was not merely unintended, it was unperceived and in fact imperceptible; and it is elementary law that an accidental result, unwittingly produced and leading to nothing, is no anticipation of a patent. We cite in a footnote some of the many authorities on this point.*

*THE LAW AS TO UNAPPRECIATED RESULTS AND FUNCTIONS IN PRIOR USES.

Perhaps the leading case on this point is *Tilghman* v. *Proctor*, 102 U. S. 707, 711. In this famous case the patented process related to obtaining fat acids and glycerine from fatty bodies by the action of water at a high temperature and pressure. Among other defences raised were certain prior uses, as to which the court said (p. 711):—

> "The accidental effects produced in Daniell's water barometer and in Walther's process for purifying fats and oils preparatory to soap-making, are of the same character. They revealed no process for the manufacture of fat acids. *If the acids were accidentally and unwittingly produced, whilst the operators were in pursuit of other and different results, without exciting attention and without its even being known what was done or how it had been done, it would be absurd to say that this was an anticipation of Tilghman's discovery.*"

We are perfectly aware that witnesses have testified in this case, fifteen years after the event, just as they did in

Judge Taft said in *Pittsburgh Reduction Co.* v. *Cowles Electric Co.*, 55 Fed. 301, 307:—

> *"Accidents of this character cannot be relied on as anticipations of a patented process (Tilghman* v. *Proctor*, 102 U. S. 707, 711) *when the operator does not recognize the means by which the accidental result is accomplished, and does not thereafter consciously and purposely adopt such means as a process for reaching the result."*

In *Andrews* v. *Carman*, 13 Blatch. 307, 323 (one of the famous "Driven Well" cases), Judge Benedict said:—

> "It is, of course, true, that, prior to Green's invention, water had been pumped from a hole in the ground, and from a small hole. Doubtless, it is also true, that, in some such case, where a pump had been inserted in a small hole, for the purpose of raising therefrom the water found therein, the principle of Green's invention may at times have been called into operation. No such case is here proved; but, if such fact were proved, Green's right to a patent would not thereby be defeated. *A chance operation of a principle, unrecognized by any one at the time, and from which no information of its existence and no knowledge of a method of its employment, is derived by any one, if proved to have occurred, will not be sufficient to defeat the claim of him who first discovers the principle, and, by putting it to a practical and intelligent use, first makes it available to man."*

In *Byerley* v. *Barber Asphalt Paving Company*, 230 Fed. 995, 997 (D. C. S. D. W. Va.), the Court said:—

> "The fact that the air as used in the Sparrow process may, or must, have had the same effect as in the Byerley process, is far from conclusive of anticipation, for *it is settled law that novelty is not negatived by a prior accidental production of the same thing when the operator does not recognize the means by which the result is accomplished, and no knowledge of it, or of the methods of its employment is derived from it by anyone."*

See also:

Hillard v. *Fisher Book Typewriter Co.*, 159 Fed. 439, 441.
Wickelman v. *A. B. Dick Co.*, 88 Fed. 264, 266.
Anthracite Separation Co. v. *Pollock*, 173 Fed. 168, 111.
Taylor Burner Co. v. *Diamond*, 72 Fed. 182, 185.
Tannage Patent Co. v. *Donallan*, 93 Fed. 811; 96 Fed. 1004.
Pittsburgh Co. v. *Seamon-Sleeth Co.*, 248 Fed. 705, 709.

the Remington-Martin case, that these trivial pitches of theirs effected Eibel's purpose; but we have shown that there is no hint of any such use in the authoritative record of the art, that is, the prior patents and publications; that in the testimony regarding every one of the alleged prior uses there is contained the definite admission of one or more witnesses that the real purpose was drainage and drainage only; and that in the operation of the Eibel principle any pitch so small as 2 or 3 inches is of no practical value. The most conclusive answer to these claims of prior knowledge and use is, however, *the actual history of the art*, which shows that just as soon as Eibel demonstrated his invention at Rhinelander, it was instantly adopted throughout the whole country. It is inconceivable that if these "prior users" were familiar with an idea which had such vast possibilities, they would have allowed it to lie dormant, without any useful development.

No one prior to Eibel had the insight to see that it was the excessive difference in speed between stock and wire that caused waves and ripples on the sheet when attempts were made to speed up production, and much less did anyone prior to him conceive the idea of using a pitch to overcome the initial difference of speed between stock and wire and thus to make faster production possible. Nor did anyone realize that it was possible to operate a machine with this high pitch disclosed by Eibel.

The Court of Appeals for the First Circuit does not base its decision on the testimony of any of the prior use witnesses—it does not "find it necessary to review in detail the great mass of evidence concerning prior uses" (Pamphlet, pp. 54, 55, 274 Fed. 551) but instead rests the case on the admitted prior art, *i. e.*, the drainage adjustments as shown for example in the prior patents and referred to on the face of Eibel's specification.

The Court says (Pamphlet, p. 59, 274 Fed. 554) that plaintiff seeks to avoid the effect of the admitted prior use of pitches, "by contending that such pitches were adopted for drainage purposes only; that they were applied in ignorance of the alleged new principle discovered by Eibel". The Court does not, as we read its opinion, definitely deny these vitally important and, as we believe, wholly conclusive distinctions as to the prior uses, but merely answers that "So contending, plaintiff's argument falls little short of claiming an absolute monopoly for Eibel of the use of gravity through pitch"; that "long before Eibel, people knew that water would run down hill and that the steeper the hill the faster the water would run" and that "paper makers must have observed the relation, whether running the stock uphill or down hill" (Pamphlet, p. 59; 274 Fed. 554); and again that "it is incredible that a skilful operator of one of these machines would have used a 3 or 4-inch pitch, with or without a substantial head, without paying some attention to the increased speed of the stock thereby induced" (Pamphlet, p. 60; 274 Fed. 555).

We reply that if any of these operators did pay any attention to such slight increase of stock speed as was produced by his trivial drainage adjustment, he at least did not discover that it had any bearing on the problem of increasing paper production on his machine. The "incredible" thing is the supposition that any of these prior operators ever appreciated the Eibel principle since not a single one of them ever took advantage of it as a means of getting the ardently desired speed increase, until Eibel made and disclosed his invention, whereupon the whole industry seized upon his idea, and wires were jacked up all over the country in the very year 1907 when his patent appeared (*supra*, pp. 39–44).

So far as the prior art is concerned, Eibel might properly have phrased his claims so as to cover the use of any pitch at all, even as little as 2 or 3 inches, *when the pitch was used in accordance with the principle of operation disclosed by him which constitutes the heart and essence of his invention*,—that is to say, when the pitch is used in co-relation with wire speed and other conditions prevailing on the machine in such a manner as to accelerate the stock to speed equality with the wire, so as to enable the wire to be run at increased speed. None of the slight adjustments of the prior art were ever used with any such purpose or result.

The reason for the limitation in the claims which confines them to the use of a substantial pitch is merely that unless a pitch of a greater order than the trivial adjustments of the prior art is used, no material benefits can be obtained in the way of the speed increases which it was the fundamental purpose of the Eibel invention to obtain.

The answer, then, to this proposition of defendant regarding the prior art is that *there is nothing whatever in the prior art even remotely foreshadowing Eibel's new principle, and that the situation is emphatically not that of an advance that is a mere obvious difference in degree, but on the contrary of one that is radically new in kind.*

EIBEL'S CLAIMS ARE NOT VOID FOR INDEFINITENESS.

The opinion of the Court of Appeals for the First Circuit on this point amounts in substance to this: that because it is difficult to draw a specific and definite line between what is and what is not a "substantial" pitch within the meaning of the Eibel claims (unless that expression means a pitch sufficient to eliminate all drag)

therefore the claims are void for indefiniteness, unless so interpreted.

If a claim were to be held invalid because cases may be put where the question of infringement is doubtful, very few patents indeed would be valid. In most patent cases the question of infringement is the primary one and it arises and is arguable only because the meaning and scope of the language of the claims is debatable. Almost never is it possible to define an invention in mathematical terms admitting of no uncertainty. Almost always there is a "twilight zone" where the question of infringement or no infringement is doubtful.

But the fact that it is difficult to say exactly when day ends and night begins does not make the terms "day" and "night" indefinite, nor does the fact that border-line cases may be stated, as to which the applicability of the terms of a patent claim is uncertain, vitiate that claim for indefiniteness.

As this Court said in *Nash* v. *United States*, 229 U. S. 373, 377, "the law is full of instances where a man's fate depends on his estimating rightly, that is, as the jury subsequently estimates it, some matter of degree."

On the question of indefiniteness as applied to Eibel's claims, the decision of the Court of Appeals for the First Circuit in this case is flatly at variance with the well considered opinion of the Court of Appeals for the Second Circuit in the Remington-Martin case, which opinion has been frequently cited and followed in subsequent cases; and it is also irreconcilable with numerous decisions of this Court, as we shall show below.

In considering such a question, as this Court has repeatedly said, it must always be borne in mind that the claim is to be read in the light of the specification, and that the patent is addressed to those skilled in the art

and not to lawyers or to the public generally. When the patent gives instructions which are adequate to instruct competent workers in the art, in language intelligible to them, how to proceed to get the patentee's result, the claim will not be held indefinite merely because it is not, and in the nature of the case cannot be, expressed in precise mathematical terms, such as to be beyond any possible dispute.

EIBEL'S INVENTION WAS NOT SUSCEPTIBLE OF DEFINITION IN TERMS OF FEET AND INCHES.

As the Court of Appeals for the Second Circuit well points out (Pamphlet, p. 14; 234 Fed. 632), "Eibel's invention is not susceptible of definition in terms of inches or feet per minute."

The pitch to be used is a variable quantity depending not only upon the speed at which the wire is to be run, but on the length of the wire, the head carried on the machine and other variables.

As the Court of Appeals for the Second Circuit said (Pamphlet, p. 15; 234 Fed. 632):—

> "Any attempt to define lower and upper limits would have been an invitation to infringers."

The only term that would apply to all pitches adapted for use in accordance with the Eibel invention is the term "substantial", or some equivalent term. The pitch must be substantial,—that is to say, of a different order from the drainage adjustments which the patent refers to and discriminates, since otherwise no material benefits could be derived from the use of a pitch in accordance with the Eibel principle. It was impossible to be more precise than this and yet adequately to cover the invention.

THE PRACTICAL WORKERS IN THE ART UNDERSTAND PERFECTLY WHAT IS MEANT BY A SUBSTANTIAL PITCH.

The Court of Appeals for the Second Circuit points out that "the practical workers in the art had no difficulty in understanding that the pitch must be higher than three or four inches" (Pamphlet, p. 15; 234 Fed. 632).

The evidence in the present case makes it even more abundantly clear than it was in the Remington-Martin case that the workers in the art have no difficulty whatever in understanding what is meant by a substantial pitch, and in differentiating such a pitch from the two or three-inch drainage adjustments of the prior art.

Out of all the witnesses who testified for the defendant in the case, not one except the patent expert Carter, who confesses he does not "pretend to be posted in paper making" (Rec. p. 924, XQ. 108), has the slightest difficulty in understanding what is meant by a "substantial" elevation. They all with one accord say that pitches of two or three inches are of no consequence but that pitches of five or six inches or more are a different kind of thing.

Thus, defendant's own engineer *Beyerl* says that his "personal idea of substantial pitch is 5 or 6 inches" "because it is quite high" (XQs. 541–542, Rec. p. 290).

Bayless, of the Bayless Pulp and Paper Co., says at (Rec. p. 709, Q. 76) that certain machines "*had no adjustment to speak of, about two or three inches*", and later he says at page 715:—

> "*X-Q.* 150. I notice that you spoke of a pitch of two or three inches as not being of much consequence. **Do you consider that there is a radical dif-**

ference between a pitch of that sort and a pitch of six inches?

A. **I do."**

Hazel, general superintendent of the St. Regis Paper Company, in answer to XQ. 315, p. 510, speaks of certain machines which "might have had *two inches,* something like that, but *they were not pitched to amount to anything*". And again he says (Rec. p. 520, XQ. 448) :—

> "*A.* Why, **I do not think the raising or lowering the breast roll three inches amounts to a darn.** I never could see it; or on any sheet. I never changed the pitch yet unless I went six inches either up or down.
>
> *X-Q.* 449. You mean nothing short of that amounts to a darn?
>
> *A.* I do not think it amounts to a darn, in my experience, and I have changed a good many of them.
>
> *X-Q.* 450. Why is that, because it does not have enough effect?
>
> *A. It does not have enough effect."*

Devine, defendant's superintendent, speaking of certain machines which he said had their wires raised about 4 to 6 inches, said (Rec. p. 235, Q. 46) :—

> "It was quite noticeable, and *you wouldn't notice anything less than that."*

Again he says at Rec. p. 245, X-Q. 191 :—

> *"You wouldn't notice two inches; I don't know whether you would notice four."*

Bailey, an experienced machine tender, says that a pitch of three inches *"would not have much of any effect on the wire at all"* (Rec. p. 532, Qs. 154–156).

Ross, treasurer of the Beloit Iron Works, paper machine builders, says (Rec. p. 392, XQ. 559) :—

> "We had set up machines running up hill about an inch, and running down hill about an inch. But **I didn't call that any pitch. When it got to five or six inches that made us shake our heads.**
>
> *X-Q.* 560. **That was a different thing?**
>
> *A.* **Yes, sir.**"

White, president of the Moore & White Company, paper machine builders, whose early machines included a breast-roll adjustment of about 2 to 3 inches, relied on by defendant as a prior use, being asked when the first machine was built by his company that "had a *substantial* possibility of the elevation of the breast-roll above the level", said that it was in 1912, and the first machine so built had a 6-inch pitch (Rec. p. 624, X-Qs. 344–348).

Every one of these statements comes from the mouth of a practical witness from the art, and a witness called by defendant.

They all agree that pitches of 2 or 3 inches are insignificant and that pitches of 6 inches or more are a very different matter practically. There could not be more convincing evidence than this mass of testimony from the practical workers in the art that the ordinary paper maker well knows what a substantial pitch is and knows that it is a different order of elevation from the drainage adjustments. It is a very significant thing that they all draw the line at about 6 inches.

Plaintiff's expert, Mr. Aldrich, agrees with all these practical witnesses, and says that he, too, would place the boundary between what is and what is not a substantial pitch at about 6 inches (Rec. p. 42, XQs. 45–48).

The only witness in the whole case who has any diffi-

culty in knowing what is a substantial pitch is Carter, defendant's patent expert, who admits that he does not "pretend to be posted in paper making" (Rec. p. 924, XQ. 108).

The Court of Appeals for the Second Circuit in the Remington-Martin case did not attempt to lay down any universal rule, but said that "it is best to confine the test of indefiniteness to the facts of a particular case".

We feel sure that this Court will agree with the reasoning of that Court as to these particular claims, as expressed in the following language (Pamphlet, p. 15; 234 Fed. 632):—

> "Where, as here, the principle of operation is made clear, the pitch is substantially higher than that theretofore known in the art, a different result is accomplished, the subject-matter is incapable of exact expression in feet and inches and the worker in the art has no difficulty in following the directions, then a claim using the phraseology of Claims 1, 2 and 3 will not be held invalid.
>
> "Any other construction might readily result in depriving a meritorious invention of its commercial value."

THE AUTHORITIES AS TO INDEFINITENESS OF CLAIMS.

The Court of Appeals for the First Circuit cites no authority whatever for its position that the claims in suit are invalid for indefiniteness because they call for a "substantial elevation" or a "high elevation" of the wire.

On the contrary, there are many authorities sustaining claims similarly worded.

Thus, the claim held valid by the Supreme Court in the leading case of *Tilghman* v. *Proctor*, 102 U. S. 707, read as follows:—

> "The manufacturing of fat acids and glycerine from fatty bodies by the action of water *at a high temperature and pressure.*"

This claim was held not void for indefiniteness, but valid, and it was furthermore held infringed, although the specification referred to a temperature of 612° F., while the defendant used a temperature of only 310°F. In the present case, Eibel shows in the drawing of this patent a pitch of almost identically the same extent as that which defendant uses in its machines (*supra*, p. 95).

In *Rubber Company* v. *Goodyear*, 9 Wall. 788, 794, the claim which was sustained by this Court was for "the curing of caoutchouc, or India-rubber, by subjecting it to the action of *a high degree of artificial heat*, substantially as herein described, and for the purposes specified".

In *Abercrombie & Fitch Co.* v. *Baldwin*, 245 U. S. 198, 205, this Court sustained the following claim:—

> "4. In a lamp of the kind described, the combination with a water-reservoir, and a receptacle for calcium carbid, of a water-tube extending from the former a *considerable distance* into the latter and adapted to be embedded in the mass of carbid in the receptacle, and a rod extending through the water-tube, and constituting a stirrer to break up slaked carbid around the outlet of the water-tube, the rod operating to restrict and thus control the flow of water to the carbid, as set forth."

In *Carnegie Steel Co.* v. *Cambria Iron Co.*, 185 U. S. 403, 436, this Court discussed the matter of definiteness in language quite pertinent to this case, as follows:—

> "It is insisted, too, that there is no mention in the

second claim of a dominant pool, and that the words, *'removing portions only of the composite molten contents of the receptacle without entirely draining or emptying the same, and successively replenishing the receptacle with fresh ununiform additions,' are satisfied by leaving a quantity of iron, however small, in the reservoir, and that it really includes nothing that was not well known before.* It is true that neither the size of the reservoir nor the amount of metal to be left therein, after each discharge is made into the converter, is specified, but it is stated in the specification that this reservoir may be of any convenient size, 'holding, say, one hundred tons of metal (more or less)', with the bottom of the discharge spout some distance above the bottom of the vessel, 'say, two feet in a hundred ton bank, and more or less according to the capacity of the vessel, the purpose of which is that when the metal is poured out of the spout a *considerable quantity* may always be left remaining and unpoured, and that whenever the vessel is replenished there may already be contained in it a body of molten metal with which the fresh addition may mix.' *Though the size of the reservoir and the considerable quantity left therein as a dominant pool might have been described more definitely, (but perhaps at the risk of an infringement being avoided by one using a receiver of a different size containing a different quantity), we think it is impossible to read this patent without gathering from it the dominant idea of Jones* not to describe a reservoir for storage, with or without incidental mixing, but to provide a receptacle the main, if not the sole, object of which is to preserve therein a large and constant quantity of molten iron as a

basis for a gradual unification of the product of several blast furnaces, or of several casts from the same furnace, and herein distinguishing it from all prior inventions. *The specification of the patent is not addressed to lawyers, or even to the public generally, but to the manufacturers of steel, and any description which is sufficient to apprise them in the language of the art of the definite feature of the invention, and to serve as a warning to others of what the patent claims as a monopoly, is sufficiently definite to sustain the patent. . . . We think this second claim not only describes with sufficient clearness the purpose of the patent to secure uniformity of the molten metal in its constituent parts preparatory to further treatment, but read with the specification sufficiently describes the process by which the uniformity may be secured, by always preserving in the reservoir a sufficient quantity of molten metal to secure such uniformity of product.*"

In *Lawther* v. *Hamilton*, 124 U. S. 1, the claim, which covered a process for extracting oil from seeds, included as one step "the expression of the oil from the seed *by suitable pressure*". To the objection that the process was not adequately described, this Court said (p. 9) :—

> "Every oil manufacturer in the country would understand him. They would also understand that it might require additional care and skill to make the new process work successfully. It is evident that they did understand him and that the manufacture of linseed oil, and oil cakes, has ever since been greatly improved and facilitated by the invention."

In *Mowry* v. *Whitney*, 14 Wall. 620, 628, to the objec-

tion that the patent did not give sufficient directions, the Court said (p. 644, 646) :—

> "it is evident that the definiteness of a specification must vary with the nature of its subject, addressed as it is to those skilled in the art, it may leave something to their skill in applying the invention, but it should not mislead them. . . . But it is obvious that only vague and uncertain directions could have been given respecting the extent to which the heat is necessary to be raised. It must differ with the difference in the progress of cooling which has taken place before the wheels are removed from the molds . . . "the degree (of heat) is left to the judgment of the operator. . . . The proof is that it (the process) has been successfully applied in the manufacture of a vast number of wheels and that failure has been very rare."

The decision of the Court of Appeals for the Second Circuit in the *Remington-Martin case* to the effect that Eibel's claims are sufficiently definite has been repeatedly cited and reaffirmed by that court in subsequent decisions.

Thus in *Vacuum Cleaner Co.* v. *Innovation Electric Company,* 239 Fed. Rep. 543, 546, the Court of Appeals for the Second Circuit said :—

> "It is further contended by the defendant that the words 'narrow inlet-slot' should either be confined to a very narrow slot of one-half inch in width or under, or should be regarded as void for indefiniteness. It was said by this Court in the recent case of *Eibel Process Co.* v. *Remington-Martin Co.,* 234 Fed. 624,—where it had been urged in argument that

such words as 'substantial elevation,' 'high elevation', and 'rapidly' rendered the claims void for indefiniteness and uncertainty:

> " 'It is difficult to lay down a rule, and it is best to confine the test of indefiniteness to the facts of a particular case. Where, as here, the principle of operation is made clear . . . and the worker in the art has no difficulty in following the directions, then a claim using the phraseology of claims 1, 2 and 3 will not be held invalid. Any other construction might readily result in depriving a meritorious invention of its commercial value.' "

Again, in *General Electric Co.* v. *Nitro Tungsten Lamp Co.*, 266 Fed. Rep. 994, 1000, in answer to a contention that the claim in suit was open to the charge of indefiniteness, the same Court said:—

> "We reassert the statement of *Eibel, etc. Co.* v. *Remington, etc. Co.*, 234 Fed. at page 632, 148 C. C. A. 390, that it is well not to attempt definition, but to consider the alleged indefiniteness of a claim in the light of the facts of each particular case. . . . When a claim defines achievement in words no broader than the disclosure, and in phrases which, as interpreted by competent workers in the art, tell one how to do what the patentee did, it can rarely be called indefinite."

In this latter case the claims sustained included the element of a filling in a lamp bulb of "nitrogen at a pressure *materially in excess* of that corresponding to 50 mm. of mercury, and a filament of Tungsten of large effective diameter." Applying the rule laid down in *Eibel* v. *Remington-Martin Company* to this claim, the Court said:

> "On the present facts it is clear that it was (1) impossible to define parts of Langmuir's lamps in millimeters or other dimensionable units, and (2) no such effort was necessary to instruct the skilled man how to make the lamp of the patent."

Again in *Westinghouse* v. *Metropolitan Elec. Mfg. Co.*, 281 Fed. 528, 530, the Court of Appeals for the Second Circuit reaffirmed its decision in the Remington-Martin Company case, saying:—

> "We have indicated so plainly that there are words not susceptible of mathematical definition, which nevertheless fairly describe what is meant to be conveyed to the skilled worker in the art, that there should be no further doubt on the point. *Eibel Process Co.* v. *Remington-Martin Co.*, 234 Fed. 624."

Similar decisions are to be found in the other circuits, of which we quote only a few.

In *Krajewski* v. *Pharr*, 105 Fed. 514, the Court of Appeals for the Fifth Circuit had before it a patent on a machine for cutting cane, the claim of which called for rollers provided with "more or less sharp teeth". The Court sustained the patent, saying (p. 518):—

> "The phrase 'more or less' has been commented on as being vague and uncertain. The rollers are provided with teeth 'more or less sharp'. If the word 'sharp' had been used alone, it would have been subject to the same criticism. The phrase 'more or less sharp' is indefinite, and necessarily so, because of the limits and imperfection of language. Taking the words in connection with the context and the specification (the only fair way to consider them), they mean sufficiently sharp for the purpose sought (the

cutting of the cane). The phrase is in current use to describe or qualify. Mr. Justice Field, in *Glue Co.* v. *Upton*, 97 U. S. 3, 6, 24 L. Ed. 985, uses the phrase: 'But to render the article new, in the sense of the patent law, it must be more or less efficacious, or possess new properties by a combination with other ingredients.' No word, perhaps, exists, that the learned justice could have selected, that would show with certainty how efficacious the article must be. And no word can be selected to show exactly how sharp the teeth must be. It seems to us sufficient to say 'more or less sharp', and that this means sufficiently sharp for the purpose shown by the specifications."

In *Fullerton etc., Association* v. *Anderson Barngrover*, 166 Fed. 443, 450, the Court of Appeals for the 9th Circuit sustained a claim, one element of which was a "weak acid", against the charge of indefiniteness.

In *Loco Stoker Company* v. *Mechanical Construction Company*, 277 Fed. 636, the Court of Appeals for the Third Circuit sustained a claim including as an element "a comparatively narrow divergent channel". There was no mention of the question of indefiniteness in this case.

THE FORM OF THE CLAIMS.

The Court of Appeals for the First Circuit criticizes the form of the Eibel claims because it says they are machine claims and not process claims. The Court says, (Pamphlet, p. 44; 274 Fed. 545):

"The plaintiff—at any rate by implication—concedes that the first three claims which cover the essence of the alleged invention can be sustained only as process claims. It is noteworthy that no

> such word as 'process' or 'method' is found in these claims or in the specification. But it is not, and cannot be, contended that Eibel invented a new machine."

We find ourselves compelled here, as in other instances, to dispute the alleged concessions by us upon which the Court's argument proceeds.

We have never conceded, nor believed for a moment, that "the first three claims" "can be sustained only as process claims".

And we have always contended and now contend that Eibel invented *a new machine* as well as a new process.

Thus our brief before the Court of Appeals said at p. 10:—

> "Regarded as a machine, Eibel's invention is a *Fourdrinier machine having the breast-roll end of the wire maintained at a substantial elevation above the level* (nothing but a *substantial* elevation will do for the purpose of Eibel). This also was absolutely new with Eibel. There had been trivial pitches used before for a different purpose—drainage regulation, but no one had ever used a substantial pitch for any purpose." (Italics in original.)

Our position is and has always been that the claims are equally valid whether construed as process or as machine claims, and that it makes no difference which they are. As we have stated many times, Eibel invented both a new machine and a new process. His new *machine* differed from previous machines in the vitally important respect that it had its wire declining at a steep angle. This declination made it possible for him to operate his machine according to a new principle never before used or apprehended. His new *process* con-

sisted in using gravity due to a pitched wire as a means of speeding up the stock to speed equality with the wire, thereby preventing waves and ripples at high speed. The claims in question, whether technically machine claims or process claims, adequately point out and describe this invention. If construed as machine claims, they are directed to a machine organization characterized by a new element, namely the substantially pitched wire; and the fact that they contain additional limitations about the effect of the pitch in no way detracts from their validity, as machine claims, but simply accentuates the function of the new element. If the presence in the claims of the language, "whereby the stock is caused to travel by gravity rapidly in the direction of movement of the wire and at a speed approximately equal to the speed of the wire", makes the claims process claims, well and good; let them be construed as process claims. In either case they are infringed, because the defendant not only uses the new machine but also the new process.

This Court said in *Corning* v. *Burden*, 15 How. 252, 269,

> "It is true that the patentee, after describing his machine has set forth his claim in rather ambiguous and equivocal terms, which might be construed to mean either a process or machine. In such case the construction should be that which is most favorable to the patentee *ut res magis valeat quam pereat.*"

In *Breuchaud* v. *Mutual Life Insurance Co.*, 166 Fed. 753, 756 (C. C. A. 2d Circuit) one of the claims called for

> "the combination with a building wall, or other structure, of beams inserted into the wall, hydraulic jacks acting against the beams and column sections aligned with the jacks and driven by the latter into

> the earth until bed rock, or other firm substrata is reached, said wall constituting a resistance to the jacks *while they are driving the column sections perpendicularly into the earth*, substantially as described."

It was important to determine whether this claim covered a process or merely a mechanical combination, since if it covered a process the Mutual Life Insurance Company, owner of the building in the construction of which the patent was alleged to have been infringed, would not be liable, but only the contractor, as he was free to choose any process which suited him, whereas if the claims were directed at a mechanical combination covering the completed structure, the owner of the building as well as the contractor would be liable. The Circuit Court of Appeals for the Second Circuit held that this claim was for a process, in spite of the fact that it purported to cover a mechanical combination, because of the use of the phrase "*while they are driving*" in the claim. In other words the Court looked at the substance and not at the mere wording of the claim to discover its nature. We do not see any necessity for determining in the present case whether the claims are properly machine or process claims; but if it is important we submit that the *Breuchaud* case is good law and an authority in point.

In connection with this matter of the form of the claims, the brief for the defendant in the Court below went a step farther than the Court of Appeals' opinion, counsel for defendant arguing that the claims were only machine claims *and that therefore it was immaterial whether or not a machine constructed according to them involved in its use a different principle of operation from the previous machines with the drainage adjustments.*

Such a position ignores the fundamental principle applied by the Courts to the determination of questions of patentability in connection with machines, namely whether or not the change in construction from prior machines brings into play a different principle of operation. If so, though the mechanical change may be slight in itself, it is always held patentable.

A leading case on this point is *Winans* v. *Denmead*, 15 How. 338. In that case the claim covered (p. 342),

> "making the body of a car for the transportation of coal in the form of a frustum of a cone, substantially as herein described, whereby the force exerted by the weight of the load presses equally in all directions and does not tend to change the form thereof, so that every part resists its equal proportion, and by which also the lower part is so reduced as to pass down within the truck frame and between the axles to lower the center of gravity of the load without diminishing the capacity of the car as described."

The Court in holding this patentable, based its decision squarely upon the new mode of operation which the change in form of the car produced. The Court said (p. 339) : —

> *"It thus appears that by means of this change of form, the patentee has introduced a mode of operation not before employed in burden cars,"*

which the Court then describes. And again at p. 341 the Court says : —

> *"Merely to change the form of a machine is the work of a constructor,* not of an inventor; such a change cannot be deemed an invention. Nor does the plaintiff's patent rest upon such a change. *To*

change the form of an existing machine and by means of such change to introduce and employ other mechanical principles or natural powers, or, as it is termed, a new mode of operation and thus attain a new and useful result, is the subject of a patent. Such is the basis on which the plaintiff's patent rests.

"Its substance is a new mode of operation by means of which a new result is obtained. It is this new mode of operation which gives it the character of an invention and entitles the inventor to a patent."

Again at p. 342 the Court says: —

"Patentable improvements in machinery are almost always made by changing some one or more forms of one or more parts, and thereby introducing some mechanical principle or mode of action not previously existing in the machine and so securing a new or improved result."

In *Keystone Mfg. Co.* v. *Adams*, 151 U. S. 139, 144, the court differentiated a prior device intended to effect the same purpose as the patent in suit (the shelling of corn), which employed like the patent in suit a "revolving shaft with wings or protuberances", on the ground that the "*mode of operation*" of the earlier device "*was entirely different*".

The question whether a new mode of operation or a new result is involved is always the determining question in considering whether joining together old elements in a machine amounts to patentable combination or merely to unpatentable aggregation.

Grinnell Washing Machine Co. v. *Johnson Co.*, 247 U. S. 426, 433, and cases cited.

In summary, we repeat that we cannot see what possible difference, from any point of view, it makes whether the claims of the Eibel patent are construed as machine claims or as process claims. In either case, the question of their validity depends upon whether the machine, or the process, whichever it is, differs from the prior art in anything more than a mere obvious matter of degree; and the question whether Eibel's principle of operation was or was not new is pertinent to this question. The test whether or not the claims are infringed is likewise the same, regardless of whether they be construed as machine or as process claims.

Certainly if Eibel's specification discloses a patentable invention, the form in which his claims are cast affords no reason for holding his patent invalid.

CHAPTER VI.

THE OPINION OF THE CIRCUIT COURT OF APPEALS FOR THE FIRST CIRCUIT IN THIS CASE.

We have already at perhaps tedious length stated the reasons why we believe the position taken by the Court of Appeals in this case to be fundamentally wrong, and we have specifically criticized a great many of the suggestions contained in its opinion.

The Court states, as its conclusion, a supposed dilemma. Either the patent is to be construed as "claiming pitch sufficient to eliminate drag", in which case "there was no useful invention, and no infringement"; or if not so limited, the claims "cover merely a degree, and are void for indefiniteness".

We shall here very briefly summarize our reply to this position.

To construe the claims as limited to pitch sufficient to eliminate drag is to make them cover only an impossibility—to read out from them all the machines which have for years been paying royalties under the patent, Eibel's own machines on which he worked out the invention at Rhinelander, the Remington-Martin machines—even the machine shown in the very drawing of the Eibel patent. Certainly no such construction can fairly be adopted, and if there is such a dilemma as the Court suggests, then it is the second horn of it which impales the plaintiff's case.

But there is no such dilemma. Interpreting the claims as they were interpreted by the Court of Appeals for the Second Circuit and by the District Court in this case, they are neither void for indefiniteness, nor as covering a mere degree.

The fundamental trouble with the Court of Appeals' opinion is that that Court substituted its own views and speculations as to what it thinks *must have been obvious* to workers in the art, for the evidence afforded by *the actual history of the art.*

The opinion, while, as we read it, not denying the fact that the drainage adjustments of the prior art differed in principle from the Eibel pitch, says that workers using the drainage adjustments *must* have appreciated the relation between pitch and speed. But the *proven facts* are, that with the whole art *craving* more speed, *no one did learn from the drainage adjustments how to get it.* Not even the most advanced workers in the art—the prior patentees, saw in their drainage adjustments any germ of a means for getting increased speed. It was Eibel that showed the workers in the art how to get their increased speed by a pitched wire, and very quick they were to follow when he led the way.

Alleged Concessions By the Plaintiff.

The opinion, it will be observed, proceeds very largely on the one hand upon what the Court says we have *conceded* and on the other hand upon what the Court says we *contend.* We respectfully ask this Court to *look to our brief*, both for our "concessions" and our "contentions" (so far as they may be of any importance), and *not to the statements in the Court of Appeals' opinion as to what we have conceded or claimed, for the Court of Appeals' opinion does not state our positions correctly.* Without attempting to list all the inaccuracies, we mention the following:—

(a) We have never conceded, as the Court several times asserts (Pamphlet, pp. 43, 47, 55; 274 Fed. 544, 545, 547, 551), that pitches of 4 and perhaps 5 inches

were used in the prior art. We absolutely deny and have always denied that any pitch greater than 2 or 3 inches was ever used.

The Court works out this "concession" by the following curious reasoning. It says (Pamphlet, p. 43, 274 Fed. 544) that the plaintiff,

> "contends that the words 'substantial elevation' in claims 1 and 3 and 'high elevation' in claim 2 cover any elevation of the breast-roll of the paper-making wire appreciably greater than that shown in the prior art, contended to be any elevation exceeding 5, or at any rate 6, inches. Plaintiff's expert testifies that a 5-inch pitch would not necessarily be the Eibel invention, 'but it might be on the border line'; that he hardly thinks a 4-inch pitch would involve the Eibel invention. It is therefore conceded by the plaintiff that the prior art shows pitches of 3 or 4 and perhaps 5 inches."

This reasoning starts with the assertion that plaintiff contends that the claims cover any breast-roll elevation "appreciably greater than that shown in the prior art." We have never taken any such position. We have said, and Mr. Aldrich testified, that a 5 or 6-inch pitch is about the border line where any advantages may be de-

rived from the Eibel invention. We agree with the many practical witnesses whose testimony we have quoted above at pp. 137–139 that such a pitch is a quite different thing practically from a 2 or 3-inch pitch. Neither Aldrich nor we have ever admitted or believed that a pitch of 4 or 5 inches was used for any purpose before Eibel. On the contrary, we have always asserted that 2 or 3 inches was the maximum drainage elevation of the prior art, and that from the point of view of Eibel no advantage begins to accrue until about twice this utmost pitch of the prior art is used (and then only when such pitch is used in a co-relation to the wire speed which was not even remotely suggested in the drainage adjustments).

If Aldrich had testified that the Eibel invention required a 10-inch pitch, apparently the Court of Appeals would have concluded that we conceded that 9-inch pitches had been used for drainage in the prior art.

That this Court may know just what Aldrich's views as to the extent of the prior art drainage adjustments were, we quote his testimony (Rec. p. 52) as follows:—

> "*X-Q.* 125. As a matter of fact, some of those earlier machines were constructed so as to be capable of an adjustment of at least 3 or 4 inches above the horizontal, were they not?
>
> *A. Not to my knowledge.* I examined a consider-

able number of patent drawings, and it did not seem as though as much as that was contemplated."

Again, he testified in answer to XQ. 131, at Rec. p. 53:—

"I have testified that, all other conditions being right, that perhaps the 5 inches might be on the border line of where the Eibel invention commenced, *as this point was considerably beyond what had been attempted before.*"

Defendant in its brief before the Court of Appeals quoted Mr. Aldrich's answer to XQ. 46 (Rec. p. 42) without quoting the next following question and answer. The whole passage reads as follows:

"*X-Q.* 46. Is 6 inches the limit?

"*A.* I would not say that less than 5 inches would constitute the Eibel invention, because something approximating that has been shown to have been in use previously, but for the different purpose of drainage."

"*X-Q.* 47. How great a pitch had been used before the Eibel invention that you refer to in your last answer?

A. I do not know, but *2 or 3 inches* have been claimed to have been used. Since such pitches might

possibly have been reached with the adjustable breast-rolls that have been used, I have no reason to dispute those claims."

This is the whole extent of Mr. Aldrich's "concessions".

(b) We do *not* "concede that the first three claims . . . can be sustained only as process claims" as the Court says we do (Pamphlet, p. 44; 274 Fed. 545). We say that it is immaterial whether they be construed as process or as machine claims—in either case they are good.

(c) We contend and always have contended, the Court of Appeals to the contrary notwithstanding (Pamphlet, p. 44; 274 Fed. 545), that "Eibel invented a new machine."

(d) We do *not* contend that any "user of a Fourdrinier machine who blocks up the breast-roll end of the machine say 5, 6 or more inches, is an infringer upon the Eibel patent." (Pamphlet, p. 45; 274 Fed. 546). What we do say is that such a user, *if he uses that pitch in such a way as to bring speed equality between stock and wire in accordance with Eibel's principle of operation,* will begin to get the Eibel benefits, to a material degree, and will properly be held an infringer.

(e) The Court at Pamphlet, p. 50; 274 Fed. 548 says:—

> "But if, instead of a 3-inch pitch a 6-inch pitch be used (an alleged infringement) with the same head [3 inches], gravity from such head and such pitch would produce a speed of 308.4, leaving to be made up by the drag of the wire 276.6. The contention then is, that, by increasing pitch-induced-gravity-speed by 31.8 feet, the plaintiff's patent monopoly is invaded."

(The wire speed assumed by the Court in the foregoing illustration is 585 feet per minute).

The statement that we contend that a machine arranged as stated in this illustration falls within the Eibel patent, is entirely gratuitous and based on nothing whatever that we have ever said. No machine so arranged would run at all. A difference of speed between stock and wire of 276 feet is utterly beyond the power of drag to overcome. With conditions as stated in this illustration, a much greater pitch than 6 inches would be necessary in order to get the stock up to speed equality with the wire so as to make the case fall within the Eibel patent.

Alleged Equivalence of Head and Pitch.

The Court spends a good deal of space in showing that speed can be imparted to the stock by increasing the head as well as by putting in pitch on the wire, and to that end copies a table of figures produced by the defendant in support of this contention (Pamphlet, pp. 48; 274 Fed. 548), from which it concludes that:—

> "These comparisons sufficiently illustrate in figures the interchangeability of head and pitch as

means of using gravity as a speed-producer." (Pamphlet, p. 50; 274 Fed. 548.)

The obvious answer to this contention, if the theory has any foundation, seems to us to be that the defendant is at perfect liberty, so far as the Eibel patent is concerned, to get its high speeds in a non-infringing way *by increasing its head,* if it wants to. This, however, it does not choose to do, preferring rather to stand an infringement suit, thereby proving very clearly that in spite of what defendant's experts say and the Court of Appeals thinks as to the interchangeability of these two methods, there *is* some reason for using the pitch instead of increasing the head.

If the argument is intended to prove that Eibel made no invention, it certainly falls far short of the mark.

No one prior to Eibel had appreciated that the reason why, when high speeds were attempted, disturbance of the stock on the wire became so excessive as to preclude the making of good paper, was the excessive difference of speed between stock and wire. This, as we have seen, was the discovery which Eibel made and upon which his invention of a remedy was based.

Whether it occurred to Eibel that this excessive difference of velocity between stock and wire, which he was the first to appreciate and with which his invention deals, could be in whole or in part avoided if the head could be sufficiently increased or whether he knew that the speed equality obtained by a high head was not so desirable as speed equality obtained by pitch we do not know. But the fact is that, in the condition of the art as it stood at Eibel's date, it was not possible materially to increase the head beyond the 6 or 8 inches which was

then being used, because at that time the practice was to carry the forward part of the pond of stock on an "apron" which rested on the wire; and if the depth of the pond had been increased much beyond the current practice, many difficulties would have resulted,—among others, the table rolls carrying the wire would have been sprung; the apron would have sagged and wrinkled the wire at the intervals between the table rolls; the apron would have quickly worn out; and when the wire was shaken, as it always was, this meant shaking also a heavy pond resting on the wire. For these reasons it was not possible for Eibel, with the machine construction then available, to increase to any material extent the heads of 6 or 8 inches then in use on the machines, had he so desired (Rec. p. 157, XQ. 88, 89).

Defendant's witness Rockwood explains that at that time the head that could be used was limited because

> "you had an apron extending down from your wire, and the weight of this pond down over the wire would cause it to wrinkle, it would sag between the rolls, you know." (Rec. p. 635, X-Q. 73.)

Some four or five years after Eibel's invention mechanism was devised which made it possible to use higher heads, by placing the pond farther back and putting the slice directly over the breast-roll. Defendant's witness Rockwood says that this new arrangement was first tried to his knowledge about 1911 (Rec. p. 634, X-Q. 69–71; see also Kinney, p. 592, XQ. 574).

Defendant's witness Ross explains that, until this change in the position of the slice was made, high heads were impossible "because the weight of that water was wearing out the apron on top of the wire" (Rec. p. 402, X-Q. 674–676).

Defendant's witness Cadwell says that, prior to this change in the position of the slice he had never heard of a head greater than 7 or 8 inches (Rec. p. 643, X-Q. 70).

If it were a fact that others following Eibel, building upon the discovery he made, devised a different and an equally good method of getting increased production, that is no reason for denying him the title of inventor.

To say that Eibel was not an inventor for the reason that he did not invent all possible ways of doing away with what he discovered to be the limiting factor on the speed of paper machines is as absurd as to say that when Morse produced the telegraph he made no invention because after his time the telephone was invented.

The history of the art as shown by this record proves that Eibel gave the world the ideal method for securing high speed, and that high head, though equivalent in the minds of Carter and Livermore with their mathematical diagrams, is *not* the same thing as pitch. The world is using Eibel's high pitch to get high speed, and the defendant and the defending syndicate show a complete disregard of the theory of Carter and Livermore and of the Court of Appeals for the First Circuit that a high head equals a high pitch.

We find, moreover, that defendant's practical witnesses take a different view of the merits of this high head, no pitch arrangement from that of defendant's counsel and the Court of Appeals. Thus, defendant's witness Kinney says (Rec. p. 569) :—

> "X-Q. 255. Then, I ask you, why you do not get it all by head, why do you use some pitch always?
>
> *A. I cannot answer that. It is a paper maker's point. That is one of the things that they insist upon, is being able to get both.*"

For some reason or other, then, *paper makers* want the Eibel pitch. Similarly, defendant's witness Smith says (Rec. p. 859) :—

> "X-Q. 356. Well, however it may be, in your judgment it is better to use a downward pitch of the wire and a low head, rather than a flat wire and a high head?
>
> *A. It is, for various reasons.*

So the art in general thinks, for, as the testimony proves, "Eibel's process is the practice of the art"; and so defendant itself thinks, because it prefers to use an Eibel pitch and fight an infringement suit rather than to use the high head and no pitch.

The Decision of Warrington, J., on British Eibel Patent.

The Court of Appeals for the First Circuit refers twice to a decision of an English judge, Warrington, J., holding a British patent to Eibel invalid. *(European Eibel Co.* vs. *Lloyd.)* The patent, the issues, the record and the law involved were all different in that case, from those in this case. This English judge's decision was also relied upon in the Remington-Martin case, but failed to impress the Court of Appeals for the Second Circuit; see that Court's opinion, Pamphlet, p. 15, 234 Fed. 632.

We have elsewhere dealt with many details of the opinion of the Court of Appeals for the First Circuit with which we take issue, and we shall not undertake here to repeat those criticisms.

CONCLUSION.

In the last analysis the case turns upon the effect of the drainage adjustments of the prior art which are referred to and discriminated by Eibel in his patent. All the prior use evidence, as Judge Hale found in this case and as the Court of Appeals for the Second Circuit found in the Remington-Martin case, amounts to nothing but proof of particular instances where these drainage adjustments had been used. The opinion of the Court of Appeals for the First Circuit, while it speaks—in general terms only—of "direct and affirmative evidence" showing prior appreciation of the Eibel principle (Pamphlet, p. 60; 274 Fed. 555), and of a "large mass of convincing evidence as to prior use which was not in the Remington-Martin suit" (Pamphlet, p. 55; 274 Fed. 552), nevertheless is professedly based not upon any such evidence—which the Court thinks it not "necessary to review in detail", but upon "the plaintiff's own admissions" as to the nature and extent of the prior uses (Pamphlet, p. 55; 274 Fed. 551).

If these drainage adjustments did not embody the Eibel principle or produce the Eibel result, as Judge Hale in this case, and the Court of Appeals for the Second Circuit in the *Remington-Martin* case found, then there is surely no reason for the nullifying construction of Eibel's claims adopted by the Court of Appeals for the First Circuit, nor for any holding that the claims are void as covering a mere difference in degree from the prior art or for indefiniteness.

What, then, if anything, did the drainage adjustments have in common with Eibel? The thing which determined whether the drainage adjustment was to be used, and, if so, whether it was to be an uphill or a downhill

adjustment, was purely and simply the *grade* of the stock as to water retentiveness. *The speed of the wire did not enter into the question at all and was not considered;* and since the adjustments were usually used on low speed machines, in which the wire speed was as low as or lower than the initial speed of the stock, it usually happened that when any downhill pitch at all was given, that pitch acted not to speed up the stock to speed equality with the wire, which it is the function of Eibel's pitch to do, but actually to *cause or increase difference of speed* between stock and wire. In a word, the Eibel principle of giving the wire a pitch and so co-relating the wire speed to it that the pitch would speed up the stock to speed equality with the wire, thereby overcoming an initial difference of velocity between stock and wire, was not even remotely suggested, and was constantly violated, in the use of the drainage adjustments.

The Court of Appeals for the First Circuit, as we read the opinion, does not definitely dispute the fact, which is admitted even by defendant's expert Livermore, that the purpose of the drainage adjustments, had nothing in common with the theory of Eibel, but takes the position that nevertheless the users of the drainage adjustments *must have appreciated the Eibel principle because they "knew that water would run downhill and that the steeper the hill the faster the water would run"*, and because *"drainage depends in part upon speed, and paper makers must have observed the relation, whether running the stock uphill or downhill."*

Here it seems to us lies the fundamental error of the Circuit Court of Appeals in this case. It substituted its own views as to what must have been obvious to the users of the drainage adjustments, for the actual facts as proved by the history of the art.

Of course the prior users knew that water runs downhill, and that giving the wire a downward pitch would tend to hurry it down the wire. But to know this was very far from knowing the Eibel principle. These users did not even appreciate the fact that the cause of the turbulence of the stock on the wire which foiled every effort to increase machine speeds beyond the definite limits then prevailing, was excessive difference of speed between stock and wire. This was Eibel's discovery, upon which his invention was based. Much less did the prior users conceive that this limitation on the speed of the machines could be done away with and the wire speed increased indefinitely by giving the wire a high pitch and thereby calling into operation gravity as a speed-giving factor for the stock.

The controlling fact is that although the whole industry was eager for any means of increasing speed, these drainage adjustments suggested to no one any method of getting the desired increase of speed. It was Eibel who gave that increase to the art. The eagerness with which the whole industry seized upon his idea when once he had disclosed it, *conclusively disproves any theory* that his idea was a mere obvious extension of what was in the art before him.

The view taken by the Court of Appeals for the Second Circuit in the Remington-Martin case and by the District Court in this case as to the Eibel patent and its place in the art, is we submit, the correct and just view, rather than that of the Court of Appeals for the First Circuit in this case.

We believe it to be clear that the decision of the Circuit Court of Appeals for the First Circuit should be reversed, and the decree entered by the District Court

awarding the plaintiff an injunction and accounting should be affirmed.

Respectfully submitted,

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APPENDIX A.

DETAIL DISCUSSION OF THE PRIOR USES.

THE LISBON FALLS PRIOR USE.

In their argument before the District Court, counsel for defendant laid most emphasis upon the so-called "Lisbon Falls prior use", although defendant's expert, Mr. Carter, appeared to stress more particularly the so-called "Bayless-Austin prior use". (See Rec., p. 920, XQ. 88; p. 921, XQ. 92.)

All the so-called "prior uses" are much the same in character, and when one is disposed of, all are really disposed of, so that it makes little difference in what order they are treated. In view, however, of the emphasis laid on the Lisbon Falls use in the District Court, we shall take this up first.

As to this Lisbon Falls use, Judge Hale said (Pamphlet, p. 27; 267 Fed. 852):—

> "This relates to two machines of the Pejepscot Paper Company. There was a pitch of two inches used on these machines before the Eibel patent. *This use was clearly for 'carrying the water nearer to the suction box'.* Evidence was offered by the defendant tending to show a pitch of four inches or more; and that such pitch was used for purposes which might be held to be within the Eibel patent. *After examining this testimony I find it insufficient to establish either the date or other substantial facts with reference to this alleged prior use.* . . . After a careful study of all the evidence offered by the defendant to prove anticipation, either in patents or by a prior use, I am led to the conclusion that no one of the prior inventors or alleged users disclose any of the inventive purpose of Eibel. No one

shows any knowledge of any relation between the pitch of the wire and speed, or of the use of gravity to aid the other elements in well-known use before Eibel."

The Lisbon Falls prior use relates to two machines of the Pejepscot Paper Company at Lisbon Falls, Maine. The only evidence regarding the matter is the depositions of Dickinson (Rec., p. 725) and Hall (Rec., p. 743).

These machines, *as they are at the present time*, are represented by Carter's diagram No. 8, which shows a 4-inch pitch obtained by blocking up the breast-roll end of the machine.

The *first* answer to this defense is that the use of even this 4 inches of pitch on these machines at any time prior to Eibel's date is wholly unproved; there is no evidence to that effect worthy of any reliance. A trifling pitch of 2 inches only is the only thing proved prior to Eibel.

The *second* answer is that the purpose of such pitch as was used was mere drainage regulation, which, as we have seen, has nothing to do with the Eibel principle.

The Only Pitch Used at Lisbon Falls Prior to Eibel was 2 Inches.

That Dickinson put in a 2-inch shim or block under his wire in June, 1902, is proved by an entry in his diary (Rec., p. 729, Q. 70). Not only is there no record evidence, but there is no evidence at all worthy of any reliance whatever, that any pitch greater than this was used on the Lisbon Falls machines until some date subsequent to Eibel's invention.

The only testimony on the point comes from Dickinson and Hall.

Dickinson said on direct examination that the blocking which is now under these machines and which he says is sufficient to give the wire a pitch of 3 to 4 inches was put in "I think it was right around 1904 or '05", but "I haven't any record of it" (Rec., p. 729, Q. 82). *This is all that Dickinson had to say on the point;* and it needs no argument to show that any such loose estimate of a date is not to be accepted as evidence of any date prior to the filing of Eibel's application (August 22, 1906), to say nothing of his earlier date of actual invention, which defendant's own witnesses fix as *some time in 1905.* (See Tomske, Rec., pp. 317, 318, XQs. 269–279; Ludwig, Rec., pp. 298, 299, XQs. 55, 56, 64, 65.) Dickinson's recollection of dates is so erratic that he placed the time when the Eibel installation was put in the Berlin Mills as "five or six years ago", when in fact it was in the year 1907 (Rec., p. 738, XQs. 221, 222; Rec., p. 543, XQ. 357). No such loose offhand testimony as this of Dickinson is to be accepted as fixing any date at all; but even if the date when the 3 or 4 inch pitch was put in was, as Dickinson said, "around 1904 or '05", that does not show that it was earlier than Eibel's invention. *Dickinson's* testimony, therefore, certainly fails to prove any pitch greater than 2 inches prior to Eibel's date.

What then does *Hall*, the only other witness on the subject, say? Hall started out by asserting on direct examination that the present blocks under the breast-rolls of these machines were put in "right around 1902 or '03, in that vicinity; I haven't any record of it". But on cross-examination he had to admit that the blocks used to produce the pitch have been changed from time to time (Rec., p. 745, XQs. 34–37); and he finally admitted that *he could not even say whether the blocks were put in before or after he became superintendent of*

the plant, which was 7 or 8 years ago (Rec., p. 747, XQs. 69, 70, 71), and he ended by admitting that he "hadn't *much of an idea when the blocks were put in*" (Rec., p. 747, XQ. 74).

We say, therefore, in the first place, that it is not proved by evidence that can be accepted by any court, much less by evidence conforming to the high standard of proof required for a prior use, that any greater pitch than 2 inches was used on these machines prior to Eibel's date; and defendant's first assumption, that a 4-inch pitch was used, falls to the ground.

The Purpose of Whatever Pitch the Machines had was Mere Drainage Regulation.

Nothing could be clearer than the testimony of defendant's witness Hall, *who is the superintendent of the Lisbon Falls mill and has been familiar with the machines in question since* 1892 (Rec., p. 743, Qs. 6, 7), that the purpose of the pitch was *merely drainage*. He testified (Rec., p. 745):—

> "*X-Q.* 30. What is the idea of running it with a little pitch downhill?
>
> *A. Carrying the water nearer to the suction boxes.*
>
> *X-Q.* 31. *So that the water wouldn't drain out so fast?*
>
> *A. Yes.*"

Defendant's counsel try to explain away this testimony by saying that Hall was referring here to the time before the blocking was employed and when the wires were given a small amount of pitch by means of adjusting screws provided on the machine. Mr. Dickinson asserted that these machines were originally provided with

a screw adjustment whereby the breast-roll could be raised an inch above the level or dropped an inch below the level (Rec., p. 727, Qs. 30–41), and defendant's argument is that Hall's testimony, setting forth the drainage purpose, related only to this original screw adjustment mechanism which came with the machine, and not to the blocks or "shims" put in later.

Defendant's argument is entirely without basis.

Hall had just testified that the original screw adjustment that came with the machine *had nothing to do with the breast-roll at all,* but was a mere table-roll adjustment, and that all it allowed was the *dropping of the table rolls below the level and not the raising of them above the level at all,*—that is to say, that *it provided for no downhill pitch to the wire at all* (Rec., p. 744, XQs. 20–23). He then testified about the blocks at present under the machine, and then there followed the question (XQ. 30) :—

> "What is the idea of running it [the wire] with a little pitch downhill?"

The question obviously related to the purpose of the pitch imparted by the blocks, and not to the original screw-adjustment mechanism.

Defendant's counsel cannot then explain away Hall's definite testimony in this manner.

It is true that Dickinson, now schooled in the Eibel patent, made the assertion that the purpose for which the blocking was used was something other than drainage. He said that the blocking was put in to avoid "cross waves", and that when it was used "the water seemed to cut the speed of the stock, picked up with the wire better" (Rec., p. 730, Q. 91). This was, of course,

an attempt to talk in the language of the Eibel patent, but obviously a very confused attempt.

Nothing is easier than for a witness, and even an honest witness, well disposed to the defendant and anxious to defeat the patent and to magnify his own work, to make himself believe that his present knowledge dates back to an earlier period; there were many other witnesses in the present case besides Dickinson who tried to give that impression, just as there were many witnesses in the Remington-Martin case who made similar statements.

But any such claim would be disproved, even if it were not contradicted as it here is by the express testimony of Hall, the superintendent of the mill, who certainly ought to know the facts, by the *inherent probabilities* of the situation. It is inconceivable that if Dickinson had really appreciated the Eibel principle, had conceived that by the use of a pitch vast increases of speed could be gained, the idea would have lain dormant. We have shown that, just as soon as Eibel disclosed and demonstrated the idea, the news spread by word of mouth and by publications from one end of the country to the other, so that within a year after Eibel's patent came out, almost all news mills were using the Eibel invention.

Finally, if anyhing further were necessary to prove that Hall was right and Dickinson wrong in his statement as to the purpose of this infinitesimal pitch, it would only be necessary to refer to the testimony of defendant's own witnesses, who all agree that, for Eibel's purpose of increasing speeds, any such pitch as 2 or 3 inches is of no account. We refer to the testimony of defendant's witnesses quoted above (pp. 137 *et seq.*), such as that of *Hazel,* who said:—

"I don't think the raising or lowering the breast roll 3 inches amounts to a darn;"

of *Derine*, who said:—

"You wouldn't notice 2 inches, I don't know whether you would notice 4;"

of *Bailey*, who says that 3 inches

"wouldn't have much of any effect on the wire at all;"

and of *Bayless*, who says that certain machines

"had no adjustment to speak of, about 2 or 3 inches."

The fact that the 2-inch pitch that was used at Lisbon Falls was worthless for any other purpose than that of drainage regulation is quite enough to disprove any oral testimony, fifteen years after the event, that it had another purpose.

The testimony as to this point, then, *affirmatively proves* that drainage regulation was the purpose of the Lisbon Falls 2-inch pitch. But that is not the question. The question is whether the defendant has sustained the burden of proving, and that, too, beyond a reasonable doubt (which is the test laid down by the authorities for prior use evidence), that the function of this Lisbon Falls pitch was the same as that of Eibel. It is, we submit, utterly impossible so to hold, and Judge Hale's conclusion was the only possible one on the evidence.

The Lisbon Falls Machines do Not even Now Use the Eibel Invention.

Not only did the Lisbon Falls machines not use the Eibel invention before Eibel, but they have not used it since, and are not now using it, if Dickinson's testimony is to be believed. He testified that the only pitch which

they are even now using is between 3 and 4 inches (Rec., p. 735, XQ. 173), which is insufficient to give any substantial effect in the way of a gravity feed and which no one claims to be the "substantial" pitch of the Eibel patent. It is of the same order as the other drainage adjustments of the prior art, which Eibel on the face of his patent distinguishes.

Since the Lisbon Falls machines do not use the Eibel invention, they do not get the high speeds which the Eibel invention makes possible. They run apparently about 500 feet a minute, although there are some statements of higher speeds. Dickinson says (Rec., p. 738, XQ. 227):—

> "In later years we went down to 500."

And XQ. 230:—

> "One time when we were running 550 feet we didn't make as much paper as we did when we were down to 500."

The defendant and everyone else is perfectly free as far as the Eibel patent is concerned to run like the Lisbon Falls machines with a 3 or 4 inch pitch.

In fact, the Lisbon Falls machines apparently are so arranged that the wires first run uphill and then downhill, which certainly does not indicate any appreciation even now of the Eibel principle. We quote Mr. Dickinson's testimony to this effect (Rec., pp. 742, 743):—

> "*RDQ.* 296. Mr. Dickinson, on the machines at Lisbon is the top of the breast roll, the highest point of the wire, at the breast roll end?
>
> *A.* No. The tube roll is a little higher than the breast roll.
>
> *RDQ.* 297. How much higher?

A. We carry it a little higher, perhaps a quarter of an inch, three-eighths of an inch. It runs up hill so as to get your deckle edge, lap on the tube roll. I don't know exactly how much it would be; probably a good quarter of an inch higher than the breast roll. *I think our wires run up hill."*

THE BAYLESS-AUSTIN PRIOR USE.

This was defendant's expert Carter's "banner" prior use, upon which he chiefly relies. At least, in his view, it is as close to Eibel as any of the prior uses. Mr. Carter testified (Rec., p. 920) :—

"*X-Q.* 88. Is the Bayless machine indicated in your diagram No. 5 as close an approximation to the construction and mode of operation of the machine described in the claims of the Eibel patent as any of the various machines shown in your diagrams?

A. I think so, on the whole."

See also to the same effect Rec., page 921, X-Q. 92.

The Bayless-Austin Machines and Defendant's Contention Regarding Them.

The machines referred to in connection with this prior use were installed at the mill of the Bayless Manufacturing Company in Austin, Pa., in the year 1902, by J. H. Horne & Sons Company, of Lawrence, Mass. Witnesses both from the Bayless Company and from the Horne Company testify regarding the machines, and there are in evidence the original specifications and contract under which the machines were constructed, and the original drawings. These machines were supplied with the adjustment for slightly raising and lowering the

breast-roll which is shown in the Barrett & Horne patent No. 691,333 (Rec., p. 1042), and the drawings of this patent illustrate literally the construction used in the machines, upon which the claim of prior use is based.

Defendant put in evidence a so-called "illustrative model" (Defs. Ex. V1), which is supposed to illustrate roughly the construction of these machines, but this is not claimed to be in any sense accurate as to dimensions, or indeed to be anything more than a mere illustration of the machine. (See Mr. Paul's statement, Rec., p. 718).

Some of the witnesses assert that, as the breast-roll adjustment on these machines was constructed, it provided for a raising of the breast-roll as much as 6 inches above the level, as well as for lowering it to 2 inches below the level. This statement is absolutely disproved by the *record evidence* of the drawings themselves, which show that 3 inches was the maximum possible adjustment above the level, and defendant's witnesses moreover admit that the maximum adjustment was never used. We note that in Mr. Carter's diagrams he assumes pitches of 4½ inches on the No. 2 machine and 5 inches on the No. 1 machine, instead of the 6 inches originally claimed by defendant's witnesses; but even these pitches are *about twice as much* as he had any right to assume upon the evidence.*

* Most of Mr. Carter's diagrams of the prior uses assume conditions that are very far from the actual facts proved.

Summary of the Answers to the Bayless-Austin Prior Use.

The Bayless-Austin prior use is merely a typical illustration of the minute adjustments for drainage purposes shown in many prior patents and referred to on the face of the Eibel patent (p. 1, lines 80–87), and differs in no material way from the many similar prior uses which were set up in the Remington-Martin case and which were held immaterial by the Court of Appeals for the Second Circuit.

We shall show, *first*: that the No. 2 machine was never pitched at all until 1912, five years after the Eibel patent, so that Mr. Carter's diagram No. 6, purporting to show a 4½-inch pitch on this machine, is immediately read out of court; *second*: that the purpose of the adjustment provided on these machines was merely to regulate drainage, just as in the prior patents and prior uses passed upon in the Remington-Martin case, a purpose having nothing in common with the Eibel invention, and involving not the slightest apprehension or conception of the principle of Eibel; *third*: that the conditions prevailing on these machines as to speed of wire and head behind the slices were such that the stock entered upon the wire at a speed at least as great as the wire speed, so that any pitch at all would have caused the stock to "overrun", *i. e.*, to go faster than the wire, and therefore would necessarily have exactly the opposite effect from an Eibel pitch, the function of which is to overcome speed differences between stock and wire and bring the stock up to equality of speed with the wire; and *fourth*: that as a matter of fact the total possible pitch could not have been more than 3 inches, instead

of the 6 inches claimed by defendant, and in reality that even less than 3 inches was used.

The No. 2 Machine was Never Pitched at all Until at Least Five Years After Eibel's Patent Issued.

Defendant evidently claims that the No. 2 machine as well as the No. 1 had a pitched wire, since its expert, Mr. Carter, produces among his diagrams one showing this machine with a 4½ inch pitch (Diagram No. 6, Rec., p. 165, following p. 1092). But the fact is that, whatever may be said of the No. 1 machine, the No. 2 machine at least was never pitched at all until as late as 1912—five years after Eibel's patent issued. This is definitely admitted by defendant's witness John Anderson, who was superintendent of the mill continuously from 1902, when the machines were put in, *until July, 1912* (XQ. 102, Rec., p. 698), and who installed whatever pitch there was. Anderson testifies (Rec., p. 694) :—

> "*Q.* 55. The No. 2 machine, what was the practice with that?
>
> *A. That machine was run level when I was there,* because that machine took the paper from the light weights and went down to the heavy. . . .
>
> *Q.* 56. At that time was that run on an elevation while you were there?
>
> *A. No, I never run that elevated while I was there,* because I had the heavy weight paper on it."
>
> "*X-Q.* 81 (p. 696). *The No. 2 was always run level during your connection with the company?*
>
> *A.* Yes."

Mr. Bayless at first testified that the No. 2 machine was run with the same pitch as the No. 1 (Q. 69, p. 708), but on cross-examination, when it was called to his at-

tention that Mr. Anderson had testified to the contrary, he admitted that Mr. Anderson might be right about it (Rec. p. 713, XQs. 135, 136).

Accordingly, the No. 2 machine, which forms the subject of Mr. Carter's diagram No. 6, and which is there represented as having a 4½-inch pitch, may be entirely dismissed from the case, and the misleading diagram goes with it.

Any Pitch Used on the Bayless Machines was Merely a Drainage Adjustment.

It explicitly appears by the testimony of all witnesses regarding the Bayless-Austin machines that drainage regulation was the purpose of the breast-roll adjustment which was provided on them. The Bayless Company was making heavy papers on the No. 2 machine, and for that reason did not require or use any pitch on the No. 2 machine (Anderson, Rec., p. 694, Q. 55; Bayless, XQs. 135, 136, p. 713). It was making light papers on the No. 1 machine, and it was thought desirable, therefore, to give the wire on that machine a slight downhill pitch so as to retard drainage by giving the stock less time to drain on the wire before reaching the suction-box than if the wire were horizontal.

Defendant's witness Brown explains the reason for using the pitch as follows:—

> "As we came on the lighter weight paper they found out they had to raise their pitch up so as to carry more water down over the wire to the suction-boxes." (Rec., p. 672, Q. 25.)

Defendant's witness Anderson, who installed whatever pitch there was, explains his reason for putting it on as

being "*to allow the water to go down the machine farther* so that the sheet would be closed better" (Rec., p. 694, Q. 51). And again he says (p. 698) :—

> "*X-Q.* 100. It was a matter of *drainage of the stock?*
>
> *A. Yes.*"

Defendant's witness Bayless, upon whose order the machines were built and who specified that the adjustment should be provided, explains his reason for wishing the adjustment, as follows (p. 712, XQ. 122) :—

> "With a light weight paper, if we had no pitch the water would immediately drop away from it before it ever reached the suction boxes, the water, most of it, and it would be so dry there we would not get any formation, spongy, a poorly made sheet of paper."

And he explains that he wished also to be able to adjust the wire so as to run it uphill when making extremely heavy papers (XQs. 123, 124, Rec., pp. 712, 713).

The witnesses from J. H. Horne & Sons Company, the machine builders who built these machines, testified in similar terms as to the reason for the adjustment. (See Q. 51, Rec., p. 751; XQs. 213–215, Rec., pp. 764, 765; XQs. 221, 222, Rec., p. 765.) Mr. Barrett, who, with Mr. J. E. Horne, devised the particular mechanism that was used in this adjustment and who is one of the patentees under the Barrett & Horne patent No. 691,333 showing the mechanism, testified as follows (p. 780) :—

> "*X-Q.* 231. And the purpose is to get the stock to the suction boxes with more moisture in it than it would have?
>
> *A.* That is right. That is what I understand.

X-Q. 232. If it were level?
A. Yes, sir."

The other patentee, J. E. Horne, testifies in a substantially similar way at Qs. 74–76, Rec., pp. 791, 792. Both Horne and Bayless testify that the admirable statement of the drainage regulation principle contained in Barrett & Horne patent 634,228 (quoted above at p. 69) applies equally to the modified adjusting mechanism put in on the Bayless machines and covered in the later Barrett & Horne patent No. 691,333 (*supra*, p. 68). (Horne, Rec. pp. 797, 798, XQs. 137–140, 143, 144; Bayless, Rec. p. 716, XQ. 177.)

Any Pitch at all on the Bayless Machines would have Caused "Over-running".

We have shown that the drainage adjustments of the prior art have no relation at all to the Eibel pitch and do not imply the least conception of the Eibel idea, and were usually used, when the adjustment was downhill at all, under such conditions that they caused the stock to "overrun" the wire, increasing instead of decreasing speed difference between stock and wire and increasing instead of eliminating commotion on the sheet, thus doing exactly the opposite thing from what the Eibel pitch does. In the Bayless-Austin case we have a typical example of such "over-running" caused by the pitch.

Mr. Carter's diagrams representing conditions on these machines (Diagrams Nos. 5 and 6, Rec., p. 165 following p. 1092), do not correctly state the facts in these respects; and his figures, based upon his erroneous assumptions, are therefore wholly incorrect. The head assumed by Mr. Carter for the No. 1 machine is "3 to 4 inches", and that for the No. 2 machine is 4½ inches.

But in fact the head carried on these machines was in each case *at least 6 inches* and often more. Defendant's witness Bayless, owner of the machines, so testifies (p. 716):—

"*X-Q.* 174. You said that the head in the pond behind the slices on the No. 1 and 2 machines at Austin was from 6 to 8 inches?

A. I think that is about correct."

Defendant's witness Anderson, the superintendent of the mill, who installed the pitch, likewise says (p. 695, Q. 62):—

"We had about a 6 inch flow of 6 inch depth in the apron, as we call it."

And again, at page 697, he testified:—

"*X-Q.* 91. Did you ever get a higher head than 6 inches in the flow box?

A. Sometimes conditions in stock would change and the flow would build up possibly half an inch."

Now, a head of even 6 inches will result in an inital velocity of the stock as it enters upon the wire of *330 feet per minute*, this figure being calculated from the table "Defendant's Exhibit T-8" (Rec., p. 147 following p. 1086) used by Mr. Carter in his calculations, and being the figure arrived at by him for a 6 inch head (Rec. p. 900).*

But the wire speed on these machines was never, at least prior to 1907, when the Eibel patent issued, as

* In order to make these calculations, Mr. Carter, in order to get the average head, deducts from the total head (in this case 6 inches) one-half of the height of the slice opening, which he assumes to be 1 inch. The speed shown on the table produced and used by him (Defendant's Exhibit T-8), corresponding to a head of 5½ inches, is about 330 feet per minute.

much as 330 feet per minute and it was often much less. Defendant's witness Brown, who has worked on the machines ever since they were installed, says that prior to 1916 the fastest paper speed ever maintained on them was 325 feet per minute (Rec., p. 685, XQs. 260–264), and that in 1904 and 1905 it was about 300 feet per minute (XQs. 265, 266, Rec. p. 685). These speeds are paper speeds, and the corresponding wire speeds are about 8 per cent less (*supra*, p. 93) or 275 to 300 feet at the maximum.

It is evident, therefore, that the speed of the stock as it issued upon the wire (330 feet per minute) was in excess of the maximum speed at which the wires were run by at least 25 feet per minute, and in excess of their normal speed by about 50 feet per minute. The stock was then already "over-running" the wire, and any pitch at all that might be given to the wire would only accentuate that over-running and cause an even greater difference between the velocity of the stock and that of the wire than there would have been with the wires flat.

Mr. Bayless says that his experience with an old machine at Birmingham was the reason for his wishing an adjustment on the later Horne machines. It is sufficient to say as to this old machine that upon his own testimony it had a maximum speed of only 200 to 225 feet per minute (XQ. 83, Rec., p. 709), and an average speed of probably 150 or 160 feet per minute (XQ. 86, p. 710), and that it carried a head behind the slices of about 6 to 8 inches (XQs. 91, 92, Rec., p. 710), which means an initial stock speed of at least 330 feet per minute (*supra*,

p. 182); so that the stock must have entered upon the wire at a speed about twice as fast as the wire was running, and any pitch at all would have increased and not decreased this relative velocity. Such pitch as Bayless used on this machine, if he used any, was a mere drainage adjustment; and it was subsequently abandoned, because Brown testifies that within his experience that machine has always been run with the wire level (XQs. 109, 110, Rec., p. 677).

The facts above cited make it clear that by no possibility could the use of any pitch on these Bayless machines have been a use of the Eibel invention, even if it were assumed, contrary to the fact, that a pitch of 6 inches had been used.

The Maximum Possible Pitch on the Bayless Machines was Not Over 3 Inches.

Several of defendant's witnesses made the statement quite positively that the breast-roll adjustment which was provided on the Bayless machines was capable of raising the breast-roll as much as 6 inches above the level. The statement was absolutely incorrect; and cross-examination of defendant's witnesses Barrett and J. E. Horne, designers of the machanism and joint patentees who took out the Barrett & Horne patent No. 691,333 to cover it, compelled both of them to admit in the light of the actual drawings of the machines that 3 inches was the maximum possible breast-roll elevation.

It will not be necessary to make a study of the drawings of the machine, because we have these definite admissions,—but for a complete understanding of this subject, reference should be made to the drawings of the machine Defendant's Exhibit V-5 (Rec., p. 157 following p. 1092), Defendant's Exhibit V-6, Defendant's Ex-

hibit V-10, Defendant's Exhibit V-12, Defendant's Exhibit V-13, and Defendant's Exhibit V-14; to the drawings of the Barrett & Horne patent No. 691,333 (Rec., p. 1042), Defendant's Exhibit V-8; to Barrett's cross-examination, Rec., pp. 776–786 and 806–812, and to Horne's cross-examination, Rec., pp. 793–796.*

*The actual machines were constructed indentically like the drawings in evidence, and the drawings of the patent were made from the actual machines or from the drawings thereof (B. F. Horne, p. 760, XQ. 162; p. 755, Q. 93; Barrett, p. 776, XQ. 164; p. 780, XQ. 243; p. 808, XQs. 452-454).

If the court will refer to Fig. 1 of this Barrett & Horne patent 691,333, sufficient details of the adjustment mechanism will be seen so that the matter can be understood. The breast-roll mounted on the frame 16 of the machine is seen at 7. 32 is a hook attached to the frame 16 of the machine, under which passes a cable 31 in the fixed post 30. As this hook is raised or lowered by raising or lowering the cable, the breast-roll end of the machine will be raised or lowered. The cable is attached at the top to a yoked bolt 45, which is more particularly illustrated in Fig. 4 of the patent. This bolt has a screw-threaded portion which engages in the hub of the worm wheel 40, so that as the worm wheel 40 is rotated the bolt and with it the cable and frame of the machine are raised or lowered. The worm wheel 40 may be rotated by turning the hand wheel 56 (Fig. 1), which has a gear intermeshing with the worm wheel 40.

In Fig. 1 of the patent the position of the machine is shown with the wire horizontal. A glance at this figure shows that the projection of this screw 45 above the worm wheel 40, available for lowering the frame of the machine, is at least as great as the portion of the bolt beneath the cap 35, which is available for raising the frame,—that is to say, that it is contemplated that the breast-roll should be capable of being lowered below the level at least as much as it is raised above the level. There are at least three factors which limit the possible extent to which it can be raised above the level: *first*, the extent of the screw-thread on the bolt 45 (see Fig. 4). The bolt cannot be raised any farther than to the point where the lowest part of its screw-threaded portion enters the hub of the worm wheel 40. *Second*, even if the thread on the bolt extended down to the yoke, it could only be raised until the yoke came in contact with the bottom of the cap 35. *Third*, the hook 32 moves in a slot 33 in the post 30 (see the right-hand

Mr. Barrett, in his affidavit filed in opposition to the motion for preliminary injunction, had said that the breast-roll of this machine could be raised 4½ inches above the level. (See XQ. 254, p. 781.) But he started his deposition in this case by asserting that it could be raised *6 inches* above the level (Q. 27, p. 769). We will quote a few passages from his deposition, showing the successive stages by which he receded from this position until finally he arrived at the admission that 3 inches was the maximum possible adjustment above the level.

First, he loses his certainty that it could be raised as much as 6 inches.

Page 784:—

> "*X-Q.* 290. Well, can you say *for sure* that is was possible to raise that in that machine up to 6 inches above the level?
>
> *A. No.*"

After further study of the drawings he concludes that it was probably *4 inches.*

Page 808:—

> "*X-Q.* 464. *And your best judgment would be that it was 4 inches?*
>
> *A. I wouldn't want to say now.*
>
> *X-Q.* 465. *Well, that is the probability, is it not?*
>
> *A. Yes, sir, that is the probability.*"

After yet further cross-examination in the light of the drawings he comes down to *something less than 4 inches.*

side of Fig. 3 of the patent) and cannot rise any farther than the space between its top and the top of the slot.

The dimensions of these parts shown on the actual drawings of the machine are such that, as Mr. Barrett was compelled to admit, the breast-roll could not have been raised above the level more than 3 inches.

Page 810:—

"*X-Q.* 492. *In view of the drawings and the other evidence, isn't it probable that it was less than ¼ inches?*

A. Probable, yes."

At last he is compelled to admit that *3 inches* is the maximum possible above the level, and that the breast-roll could be dropped the same distance below the level.

Page 811:—

"*X-Q.* 504. Assume that the position of the hook and of the cable were exactly as shown on the tracing Exhibit V-5 and the corresponding blueprint, Exhibit V, and that the screw used were that which you have shown in your layout drawing. Please measure on Exhibit V-5 and tell how much possible vertical adjustment above the level of the breast-roll there would have been?

[The witness measures.]

A. This went down 3 inches."

X-Q. 505. Still making the assumption stated in the last question, how much adjustment below the level would there have been on the Bayless machine?

[The witness measures.]

A. This went down 3 inches."

Thus the witness' deposition ended with the definite flat admission that with the parts constructed in accordance with the drawings submitted by him (and he had testified that they were so constructed (see footnote, *supra*, p. 185) *the utmost breast-roll adjustment above the level was 3 inches,* and there was a like adjustment of 3 inches below the level.

Horne's final testimony in the matter was similar:—

"*X-Q.* 106 (Rec., p. 794). And I understand your

testimony to be that, taking the showing on that tracing, the maximum adjustment of the breast-roll above the level would be three inches?

A. Yes."

"*X-Q.* 120 (p. 796). . . . assuming the construction at the top of that post to be as indicated in Fig. 4 of the patent, then the maximum adjustment above the level on that breast-roll, if it was constructed strictly in accordance with the tracing, Exhibit V-5, *would be two and one-quarter inches, would it not?*

[Witness measures.] *A.* Yes."

Defendant made no effort to contradict these admissions. This was the final word on the matter.

If the defendant had any reason to disagree with these admissions of Barrett and Horne, there were always the actual machines themselves which could have been examined and tested; but defendant made no such test, or at least put in no evidence about any such test, although its expert, Mr. Carter, examined the machines. (See Carter, XQs. 95–98, Rec., p. 922.)*

* Mr. Carter's examination of the machines proved at least that at the present time, although the wires in both machines are pitched, no material part of the pitch is obtained by the adjustment mechanism. Instead the Bayless Company *have had to put blocking under the breast-roll ends of the machines to get 4½ and 6 inch pitches.*

The No. 2 machine is now operating with a total pitch of 4½ inches. (See Carter diagram No. 6 and his testimony regarding this diagram at page 907.) Of this total pitch of 4½ inches, 4 inches is due to a 4-inch block placed under the breast-roll end of the machine (Carter, XQ. 97, p. 922), which means that *only ½ inch is due to the adjustment of the breast-roll.*

Similar conditions prevail on the No. 1 machine, as at present used. As now used it has a total pitch of about 7 inches (Brown, Rec., p. 680, XQ. 184), and this is apparently all obtained by blocking, for Carter testifies that it is blocked up between 7 and 8 inches (XQ. 96, p. 922).

Moreover the testimony shows that the adjustment was never used in practice as high as it would go. Mr. Anderson, the superintendent of the mill during all the period in question, testifies (p. 700, XQ. 142) :—

> "I never tested it out, never measured that screw, but I knew that the screw was not entirely out and I *could have gone higher.*"

It must be taken therefore as definitely established that the utmost possible adjustment above level of the Bayless machines was, not the 6 inches which some of the witnesses tell about, nor the 4½ or 5 inches which Mr. Carter depicts on his diagrams Nos. 5 and 6, but 3 inches; and furthermore that in practice not even this 3 inches was ever used, but probably only the one-half inch or so which is now in use on the machines.

Summary as to Bayless-Austin Machines.

In this prior use, regarded by Mr. Carter as the closest approximation to the Eibel patent of all the prior uses, we have a very pretty illustration of features which it will be found are common to all of the prior uses.

In the first place we see the utter unreliability of unsupported memory evidence. Several witnesses testifying from mere recollection, unsupported by any records, about conditions existing fifteen or twenty years ago, definitely stated that a 6-inch pitch was used on these machines; but when the drawings were produced, even Barrett, the builder of the adjustment mechanism, had to admit that 3 inches was the utmost pitch that could possibly have been used. The incident shows how salutary is the rule requiring prior uses to be proved by *record evidence.*

In the second place, we have here a typical illustra-

tion of the old drainage adjustment whereby the breast-roll was raised or lowered an inch or two for the purpose of compensating for differences in the grade of stock used or the weight of the paper being made, and we have a practical illustration to show how this adjustment often works in exactly the opposite way from the Eibel pitch, for in these Bayless machines the head and speed of the wire were such that the stock entered upon the wire at a speed greater than the wire speed, so that there was no possible room for the application of the Eibel principle. Any pitch at all given to the wire would further increase instead of decrease the initial difference of velocity between the stock and the wire. The situation was a proper one for a drainage adjustment down-hill, since light weight paper was being made, but there was no possiblity of applying the Eibel principle.

Thirdly, we have here a good illustration of the fact that a pitch of an inch or two is of no practical consequence, for if any substantial pitch had been used, the consequent over-running would have been fatal to the paper; but a pitch of 2 or 3 inches is so inconsequential as to make no difference. It did no material harm in so far as turbulence of the stock was concerned, nor would a similar pitch have done any material good if it had been used under conditions where it would have decreased instead of increased the difference of velocity between stock and wire.

We have discussed this Bayless-Austin prior use at tedious length because defendant's expert, Mr. Carter, considers it as close to Eibel as any of the prior uses, and because the same considerations, or some of them, which refute defendant's contentions here apply equally to every other one of the prior uses. By disposing of this prior use, we really dispose of them all.

THE KIMBERLY-CLARK PRIOR USE AT KIMBERLY, WIS.

The prior use which occupies the next place after the Bayless-Austin machines in Mr. Carter's diagrams, and which occupies perhaps as large a portion of the record as any of the prior uses, is that at the mills of the Kimberly-Clark Company at Kimberly, Wisconsin. Two Fourdrinier machines were installed in these mills in the year 1904 by the Beloit Iron Works, and each of them was supplied with a breast-roll adjustment constructed by the Moore & White Company, of Philadelphia, in accordance with the Moore & White patent No. 684,081 (Rec., p. 1057). This adjustment mechanism was made in accordance with the drawings of this Moore & White patent (Rec. p. 359, Qs. 119–121). There is no question of these facts.

The witnesses who testified regarding the matter are P. R. Thom, formerly of the Kimberly-Clark Company (Rec., p. 323 *et seq.*); N. J. Ross, of the Beloit Iron Works (Rec., p. 351 *et seq.*), and J. A. White, of the Moore & White Company (Rec., p. 597 *et seq.*). There are in evidence as exhibits specifications, drawings, blueprints, order cards, etc., showing the construction of this adjustment mechanism (Defts. Exs. L, M, N, O, P, R, U and U'), so that the construction of the adjustment is not left to doubt.

Mr. Carter's diagram dealing with these machines (Diagram No. 7, Rec., p. 167 following p. 1092), assumes a wire pitch of 5½ inches. As we shall see, defendant's own evidence utterly disproves this contention and indeed defendant's brief, before the Court of Appeals said (pp. 123, 124) that the pitch in these wires was 4 inches until 1910.

There is no witness who even suggests that a higher

pitch than 4 inches was used before Eibel's date, and Thom's statement that 4 inches was used is flatly contradicted by the defendant's other witness Ross (the only other witness who deals with the matter at all), who says that the wires were run flat until about November, 1906 (Eibel's patent was applied for in August, 1906).

The real facts are: (1) that this Moore & White adjustment is simply one of the numerous drainage adjustments of the prior art referred to and distinguished on the face of the Eibel patent; (2) that conditions on these machines were such that any pitch at all on the wire would have caused the stock to overrun the wire; that is, would have tended to increase rather than diminish initial difference of velocity between stock and wire, and would have accentuated rather than diminished disturbance on the sheet; that is to say, it would have operated in exactly the opposite manner from the Eibel pitch; (3) that no pitch at all was used on these machines until after the date of Eibel's application; and (4) that the highest practical pitch which could have been given to the breast-roll by these adjustments was not 6 inches, as testified to from mere recollection by Messrs. Thom and Ross, nor 5½ inches as assumed by Mr. Carter, but 2½ to 3 inches, with an approximately equal adjustment below the level. If any higher pitch could possibly have been obtained by these adjustments, it would only have been by an uncontemplated and mechanically unsafe perversion of the machine, comparable, as defendant's witness Mr. White (the designer of the apparatus) put it, to running an automobile designed for 50 miles an hour at 75 miles an hour (XQs. 228, 229, 233, 239, Rec., pp. 614, 615).

We shall now refer to the passages of testimony sup-

porting the several propositions which we have above laid down.

This Adjustment was Merely the Ordinary Drainage Adjustment.

Moore & White patent No. 684,081, under which this adjustment was built, is discussed by Mr. Aldrich at Rec., p. 135. It merely shows a slight adjustment both up and down for the breast-roll end of the machine, and says not a word as to the purpose of the adjustment, as it of course would have done if the purpose had been anything else than that of similar adjustments shown in many other patents. But we are not left at all to inference, as to what the purpose was, for all the witnesses explicitly admit that it was merely the usual drainage adjustment. Thus Mr. Thom, who represented the Kimberly-Clark Company in arranging for the installation of the machines, explains that the reason for providing an adjustment to put the breast-roll below the level was so as to give the stock more time to drain when running with heavy weight papers or slow stock (XQs. 217–219, Rec., p. 340), and that the adjustment above the level was for the purpose of carrying the water in the stock farther down the wire when running with a quick or free stock (XQs. 222–224, Rec., p. 340); and he points out that the news paper stock which the company was using was a very free stock (XQs. 223, 224, Rec., p. 340). He says (Q. 155, Rec., p. 334): —

> "This pitch arrangement helps the formation because the water is carried much farther distance on the travel of the wire, consequently that helps to make better formation."

And again at page 340: —

"*X-Q.* 220. That is the idea, you want to have it reach the dandy roll a certain consistency?

A. Yes."

Again, at page 343 he testified: —

"*X-Q.* 268. The question that you considered as to whether you should run with the wire below the level or above the level, and if above the level how high above the level, was the character of the stock as to quickness or slowness, was it?

A. Yes, that is what determined the point."

Mr. Ross, of the Beloit Iron Works, the builder of the machines, explains the same point at length (Rec., p. 379, XQs. 409–413), and concludes as follows: —

"*X-Q.* 414. You say, then, it was a matter of drainage, giving the stock a longer or shorter time on the wire, or getting more or less water out, as the case may be?

A. Yes, sir."

And finally Mr. White, of the Moore & White Company, one of the patentees under the Moore & White patent and the designer of the adjustment mechanism itself, testified to the same effect. He says (XQ. 331, p. 623): —

"As I understand it, they wanted to carry the water nearer the suction boxes, that was the reason for lifting the wire."

See also XQs. 333, 334, page 623, and Q. 112, page 605.

The purpose, then, of the adjustment was admittedly merely drainage regulation, a matter which as we have seen has nothing whatever to do with the Eibel principle.

Any Pitch at all on the Kimberly-Clark Machines Would Have Caused Over-running and Worked Results Opposite to those of an Eibel Pitch.

As we have pointed out above these drainage adjustments might be and often were used under such conditions that they actually caused an increase of velocity difference between stock and wire, rather than to decrease that difference, which it is the central purpose of the Eibel pitch to do. In these Kimberly-Clark machines this drainage adjustment, whenever it was used, worked in exactly this way,—that is to say, in these machines the speed at which the stock entered upon the wire under the influence of the head behind the slice, was greater than the speed at which the wire was going, so that any pitch at all on the wire would have actually caused an increase instead of a decrease in the difference of velocity between stock and wire, and would have tended to cause rather than to eliminate waves and ripples on the wire.

Mr. Carter's diagram showing these machines (Diagram No. 7, Rec. p. 167 following p. 1092) assumes a head behind the slices of $2\frac{3}{4}$ inches,—an assumption for which there is not a word of justification in the record. On the contrary, the testimony of Mr. Thom, the superintendent of the mills, and the only witness referring to the matter at all, is that the head was "anywhere from 4 to 6 inches" (XQ. 258, Rec. p. 343).

Assuming, then, a head of 5 inches, which is intermediate between the 4 and 6 inches testified to by Mr. Thom, we find by calculations strictly in accordance with Mr. Carter's method that the initial speed of the

stock on the wire would have been 295 feet per minute.* When the head was 6 inches, as it sometimes was, similar calculations show that the initial velocity of the stock on the wire would have been even greater—330 feet per minute (*supra*, p. 182).

Mr. Carter assumes in his calculations, as shown on his Diagram No. 7, a wire speed of 350 feet per minute. Here again his assumption is utterly without basis, contrary to the testimony of defendant's witnesses and contrary to the showing of the actual written contract under which the machines were installed. This contract (Defts. Exhibits L and M) specified that the machine should be capable of running at speeds from 50 to 300 feet per minute (Rec., p. 337, XQ. 178; RDQ. 291, Rec., p. 345): and as originally installed the machines were only capable of making these speeds (Ross, Q. 265, Rec., p. 369). Subsequently, about four years after the machines were built, which would mean not earlier than 1908 (the machines were built in 1904 and 1905 respectively, Rec., p. 353, Q. 37), changes were made in the pulleys on one or both of the machines which made it possible to run the machines as high as 375 feet per minute (Ross, Qs. 73–77, Rec., p. 356; Qs. 267–270, p. 369). It was, then, not until long after the filing of Eibel's application in 1906 that these Kimberly-Clark machines were capable of running at a paper speed of over 300 feet per minute.

A paper speed of 300 feet per minute means a wire speed of about 8 per cent less (*supra*, p. 93), that is to

* This figure is arrived at by deducting ½ inch (half the width of the slice opening) from the total head of 5 inches, which gives the average head, and by referring to the table, Defendant's Exhibit T-8 (Rec., p. 147 following p. 1086), which shows that the initial velocity of the stock under a head of 4½ inches is about 295 feet per minute. This is the figure Carter uses for a 5-inch head (Rec. p. 909).

say, of about 275 feet per minute. The highest speed at which these wires could run, then, at any time prior to the date of Eibel's patent was 275 feet per minute, and frequently they ran at less speeds, even as low as 60 or 70 feet per minute (Thom, XQ. 254, Rec., p. 342). But, as we have seen, the stock had, when it entered upon the wire, a speed of about 295 feet per minute. It was running faster than the wire at the beginning of its travel, and any pitch on the wire would merely aggravate the overrunning.

Here, then, we have, as in the case of Bayless-Austin machines, a typical illustration of the fact that the drainage adjustment not only had nothing in common with the Eibel pitch, but might and often did work exactly opposite results from the Eibel pitch.

No Pitch at all Was Used on the Kimberly-Clark Machines Until After Eibel's Date.

We have seen that Mr. Carter, in his diagram, assumes (with no basis at all in the evidence) a pitch on these machines of 5½ inches. The fact is that no pitch at all was used on these machines until after Eibel's date. The Eibel application was filed on August 22, 1906. These Kimberly-Clark machines were put in operation in May, 1905 (Rec., p. 329, Q. 93), and Mr. Thom asserted (without any record evidence whatever to back him) that a pitch of 4 inches was used on them beginning in the spring of 1905 and continuing until the year 1910 (Rec., p. 332, Qs. 129–131). But defendant's only other witness on the subject, Ross, of the Beloit Iron Works, whose company it was that installed these machines, *flatly contradicts Thom*. He says that he did not see the machines when they were first started, but he saw them about two months later and both wires were flat then

(XQ. 437, Rec., p. 381), and that it was about a year and a half after the machines were installed before he saw any pitch on them (XQ. 438, Rec., p. 381), although during this period he was frequently at the Kimberly factory looking at the machines and "probably saw them once a month" (Q. 70, p. 355). When they did finally put in a pitch it was only "between 3 and 4 inches" (XQ. 439, p. 381). The machines were put in operation in May, 1905 (Thom, Rec., p. 329, Q. 93), and if their wires were flat for a year and a half thereafter, as Ross testifies, no pitch could have been put in until at least as late as November, 1906, which is four months after the date when Eibel's application was actually filed, and even longer after the date of his invention, which defendant's own witnesses fix as some time in 1905 (Tomske, XQs. 269–279, Rec., pp. 317, 318; Ludwig, XQs. 55, 56, 64, 65, Rec., pp. 298, 299).

Thom is undoubtedly wrong and Ross right. Thom admits that there was no advantage to be gained from a pitch until speeds of more than 300 feet were attained. He says (Rec., Q. 150, p. 333):—

> "Up to 300 feet could you run that quality of paper on the level?
>
> *A.* Yes, and to better advantage, especially on the heavier weights."

And again (p. 342, XQ. 248):—

> "There was no virtue in making book paper with the pitch of the wire until you got over 300 feet."

And again (p. 333):—

> "*X-Q.* 148. Now what was the effect of the raising up of the wire in the Kimberly Mill in those machines?

A. We didn't get effect from that on account of the qualities of papers we were making until we passed 300 feet."

As we have seen, the machines were not capable of exceeding 300 feet per minute until the change was made in the pulleys about four years after they were installed, —that is to say, about 1908 or 1909. So, on Thom's own evidence, there would have been no advantage in giving the wire any pitch at all until 1908 or 1909 and Ross is evidently right in saying that the wires were run flat at least until after 1906. Probably in fact it was not until 1908 that any pitch was used.

Mr. Carter's diagram representing these machines shows conditions such as the defendant *would like to have proved*, which are utterly different from what the evidence does prove.

The Greatest Practicable Pitch Which Could Have Been Obtained on these Machines was 2½ to 3 Inches.

Since no pitch greater than 3 or 4 inches is alleged by any witness whatever to have been used on these machines prior to Eibel, and since the evidence shows that in fact no pitch at all was used on them prior to Eibel, it is really immaterial to consider how far above the level their wires could have been raised if anybody had wished to raise them. The testimony, however, makes it clear that this maximum possible adjustment was not 6 inches, as Thom and Ross offhand asserted, but 2½ inches or 3 inches. Because the matter is irrelevant, we shall not go into it at length, but will point out the definite admissions of defendant's witnesses establishing this point without giving a detailed analysis of the drawings of the machine which compelled these admissions.

In the first place we point out that, although Ross started off by asserting that a 6-inch adjustment was provided for, when confronted with the actual drawings of the machine he receded from this position and refused to vouch for that statement, although repeatedly urged and led by counsel for the defendant to do so (RDQs. 718–722, Rec., pp. 408, 409). He was compelled to change his testimony because be recognized that the breast-roll could not have been raised more than about 3 inches without providing some means of raising the suction boxes also, yet no adjustment of the suction boxes by blocking or otherwise was contemplated (XQs. 287–292, Rec., p. 371; Q. 134, p. 360; XQ. 179, Rec., p. 337; see also XQs. 568–570, Rec., p. 393); and also because the drawings of certain details of the machine showed him that not over 3¼ inches above the level could have been contemplated (XQs. 474, 475, Rec., p. 384).

Mr. White, of Moore & White, the designer of this adjusting mechanism, after examination of the drawings, definitely admitted that the adjustment above the level contemplated was only 2½ to 3 inches. We quote from his testimony (Rec., p. 620):—

> "*X-Q.* 292. And in the light of these further drawings of the 1909 machine for which you installed the adjusting mechanism at Kimberly, would you say that the adjustment contemplated above the level on these machines [*i. e.*, the 1904 and 1905 machines] was about 2½ inches? *A.* I would say 2½ to 3 inches would be about what was contemplated."

Mr. White said that if any greater elevation were given to the breast-roll than this it would be a good deal like running an automobile that will go 50 miles an hour at 75 (XQs. 228, 229, 233, 239, Rec., pp. 614, 615).

A depression of 2 inches below the level was also provided for (XQ. 293, Rec., p. 620).

For details of the reasoning by which Mr. White was driven to this conclusion, we refer to his testimony at Rec. pages 612–615. In this connection we were able to show on cross-examination that when in 1909 (two years after Eibel's patent issued), an adjustment mechanism was provided by Moore & White for a new machine for the Kimberly-Clark Company, in which new machine a 6-inch adjustment was called for, the adjusting screw shown at *g* in Fig. 3 of the Moore & White patent No. 684,081 was made 3½ inches longer than the similar screw used on the 1904 machines. It was the length of this screw, and particularly the threaded portion of it, in the 1904 machines, which limited the possible adjustment above the level to 2½ to 3 inches; and when in 1909, after the Eibel invention had come out, the Kimberly-Clark people wished to use a 6-inch adjustment, a screw 3½ inches longer had to be provided.

In summary, then, this much-talked about Kimberly-Clark Kimberly "prior use" was a mere drainage adjustment like that shown in numerous prior patents; it was capable of raising the breast-roll only 2½ to 3 inches and not 5½ inches as defendant asserts; it was never used at all until a date later than Eibel's patent application, and when it was used it was used in such a way as to work exactly opposite results from an Eibel pitch,—it increased instead of decreased the difference of velocity between stock and wire, caused "over-running" and aggravated instead of prevented waves and ripples.

Obviously, it is no answer at all to the Eibel patent.

THE BAGLEY AND SEWALL PRIOR USE.

Mr. Carter illustrates in his Diagram No. 9 (Rec., p. 167 following p. 1092) a supposed machine which he calls "Bagley and Sewall (Blue Print Exhibit) 1904", and which he assumes to have had a wire pitch of three and one-half inches.

Bagley and Sewall are manufacturers of paper machines, and their employee Kinney produced blueprints in evidence as Defendant's Exhibits T and T-1 (Rec., pp. 137, 139 following p. 1084), showing three machines which they made in the year 1904, which contained a breast-roll adjustment for drainage regulation in all substantial respects the same as those shown in prior patents except that the adjustment provided was a little larger than usual. Kinney says it was three inches (Qs. 66–68, Rec., p. 555) and so the contract says (Dfts. Ex. T-11). Lansing, the president of the company, says three and one-fourth inches (XQ. 97, Rec., p. 658). Defendant's expert Carter, with his usual policy of adding a little for the benefit of the defendant, calls it three and one-half inches in his diagram. The precise extent is immaterial; it was in any case of the same insignificant order as the other drainage adjustments with which the Court has now become familiar.

This was Admittedly a Mere Drainage Adjustment.

The first and entirely sufficient answer to this defense is that this adjustment was merely another example of the usual drainage regulation, to compensate for "free" or "slow" stock. We quote from Kinney (Rec., p. 574):—

"*X-Q.* 322. What is the theory, what is the reason

that they are used? *A.* If the stock is what they call slow your wire has to have a certain inclination; if the stock is free, it must have a different inclination.

X-Q. 323. Why? *A.* Because the water in one case comes out much quicker than in the other case.

X-Q. 324. If you have a slow stock what sort of inclination do you want? *A.* You want the breast roll down; want it low. With free stock you want the breast roll up.

X-Q. 325. *Why do you want the breast roll up with free stock? A. Because it carries the water down so much farther towards the suction boxes.*

X-Q. 326. *And the news stock was free stock? A. Yes, sir.*

X-Q. 327. And that was the reason you built these machines with the breast roll adjustable, that is why you built some machines with the breast roll below level and other machines with the breast roll adjustable above the level? *A.* Yes, sir.

X-Q. 328. To take account of the different qualities of stock as far as the drainage is concerned? *A.* Yes, sir."

To the same effect see Kinney, XQs. 537–539, pp. 589, 590, and Lansing, XQ. 104–107, Rec., p. 659.

These Bagley and Sewall Adjustments were Not Used Prior to Eibel.

In the second place, there is not the slightest evidence that these 3-inch adjustments were ever used in the operation of the machines and the fact is quite to the contrary. The wires on these machines were never run,

prior to Eibel's date, in any position other than on an absolute level.

There were only three of the machines with these 3-inch adjustments built prior to 1907; one for the Raymondville Paper Company, Raymondville, New York, another for the Frost Paper Company, at Norwood, New York, and a third for the Columbia River Paper Company at Camas, Washington (Kinney, Q. 109, Rec., p. 558, XQ. 415, p. 581). Kinney says that he saw these machines, or some of them, in use, but *is unable to say whether the adjustment was used* at all on any of them (XQs. 291–296, Rec., p. 572). This is all the evidence there is in this case on the matter.

The evidence in the Remington-Martin case showed that *both the Raymondville machine and the L. L. Frost Paper Company machine were installed with wires level, and were never pitched at all until after the Eibel patent came out.* (See deposition of Hammel, Remington-Martin Record, Vol. II, p. 188, Qs. 41, 42, as to the Raymondville machine; and deposition of Woods, Remington-Martin Record, Vol. II, p. 147, XQs. 69–71, as to the L. L. Frost Paper Company machine. The Norwood Paper Company referred to by Woods is the same as the L. L. Frost Paper Company referred to by Kinney (Kinney, Rec., p. 572, XQ. 291). There is no evidence one way or the other as to the Columbia machine.

The Carter Diagram No. 9, giving heads, speeds and other data in conjunction with a 3½-inch pitch, is then a pure fiction of Mr. Carter's imagination, like many of his other diagrams. There was *no such machine* operated.

The Bagley and Sewall Story is Another Proof of the Novelty and Importance of Eibel's Invention.

Mr. Kinney and Mr. Lansing, being interested to defeat the Eibel patent, since the Bagley and Sewall Company is an infringer (XQs. 545, 546, Rec., p. 590), not only made every effort to establish a "prior use", but also gave voluminous "histories" of the development of the Fourdrinier machine from the beginning down to the present, in the effort to show that the high pitch was a mere logical outcome or evolution of the drainage adjustments of the prior art; but the *actual facts,* which they were compelled to admit as to the history of their own machines, show more clearly than any *words* can, how false the argument is. They had to admit that, after these three machines were built in 1904 with the 3-inch adjustment, they made no others having a provision for raising the breast-roll more than 1½ or 2 inches, until 1907 (Kinney, XQs. 511–514, Rec., p. 588) (after Eibel's patent issued). Thus they were not progressing in the way of making any increase in the elevation during these years from 1904 to 1907; but, on the contrary, were actually tending in the opposite direction, to a decreased adjustment.

When asked why it was that they only put in about an inch and three-quarters adjustment on other machines which were intended to run faster than those on which the 3-inch adjustment was used, Mr. Kinney said that this was due to the fact that the paper makers found that the adjustment did not help towards getting higher speeds, and asked for lower adjustments.

We quote his testimony (Rec., p. 578) :—

"*X-Q.* 382. How did it happen that all of these

Bagley machines that you referred to in the catalogue had adjustments not to exceed 1¾ inches while the other slower machines that were made in accordance with Exhibit T had a 3 inch adjustment? *A.* Oh, partly due to the fact that they found that they could get those higher speeds without the adjustment.

X-Q. 383. *You mean you found that the adjustment did not help towards getting higher speeds? A.* We did not find; the paper makers.

X-Q. 384. *The paper makers found that? A. Yes, sir.*

X-Q. 385. And so they asked you to put in lower adjustments when they wanted to get higher speed? *A.* That was not the exact reason, but that is what they said they wanted; so much adjustment."

As soon as Eibel's patent issued, it came to the ears of the Bagley and Sewall Company, as Mr. Kinney testifies (Rec., p. 582) :—

"*X-Q.* 435. How did you happen to hear about it [the Eibel patent]? *A.* Just in mills. We go from mill to mill and *we talked about this Rhinelander scheme of raising the wire, and it soon became general knowledge.*

"*X-Q.* 437. *Well, that excited a good deal of comment at that time, did it not? A. Yes, sir.*

X-Q. 438. *And mills generally immediately began to fix their wires in accordance with the Rhinelander scheme generally throughout the country, so far as you are acquainted with it?*

Mr. PAUL. That calls for your personal knowledge.

A. Well, it is so in **news** *mills.*"

Then, for the first time, the Bagley and Sewall Company began to install the high pitch (10 inches was used on their first machine made after the Eibel patent issued) (XQs. 402, 403, Rec., p. 580), and *since the patent came out they have not erected a single news machine that has not had a pitch of at least 8 inches.*

We quote from Mr. Lansing (Rec., p. 663) :—

> "*X-Q.* 145. Can you name any news machine, sold by your company since 1907, which has not run with a pitch of at least eight inches? *A.* As we erected it?
> *X-Q.* 146. Yes. *A.* I do not recall one."

Kinney says the same (Rec., p. 581, XQs. 423, 424), and says that the Bagley and Sewall wires are ordinarily pitched about 10 to 12 inches (Rec., p. 580, XQ. 408).

These witnesses are of course compelled to admit that the all but universal adoption of the high pitch on news machines which took place in the year 1907 was directly due to Eibel. Here is a significant statement by Mr. Lansing (Rec., p. 661) :—

> *"If you have the date of when these mills generally jacked their machines up, why that is probably the time I heard the name of Eibel."* (Rec., p. 661, XQ. 122.)

Lansing continues (XQ. 124) :—

> *"So far as I know I believe that it is called the Eibel or the Rhinelander scheme.*
> *X-Q.* 125. It struck even you as surprising when you saw it at the Consolidated place? *A. I was very much interested."*

Summarizing this Bagley and Sewall story, the facts

are that this company, like other manufacturers of paper machines, had been supplying their machines, or some of them, prior to Eibel's date, with adjustments whereby the breast-roll might be raised or lowered an inch or two, or even as much as three inches in some cases, for purposes of drainage regulation. The extent of these adjustments, instead of being increased, had been decreased to not over an inch and one-half or two inches. Paper makers had found that the adjustments did not help toward getting the higher speeds that they were all striving for. In 1907 the Eibel patent issued showing the high pitch. Reports of the patent and of the adoption and success of the invention at Rhinelander spread instantly throughout the trade, and news mills generally began to install it at once, because by using it they could get great speed increases. Since then every news machine installed by the Bagley and Sewall Company has had a pitch of eight inches or more.

In the face of such facts as these, it is, we submit, useless to argue that the Eibel pitch was a mere logical growth or adaptation of the old drainage adjustments.

THE KIMBERLY-CLARK PRIOR USE AT NIAGARA.

This supposed prior use relates to two machines at the Niagara, Wisconsin, mill of the same Kimberly-Clark Company which operated the mills at Kimberly, Wisconsin, where another of the supposed prior uses was located.

The only testimony regarding these Niagara, Wisconsin, machines is given by LeValley, who was a machine tender there at one time, and is now in the employ of defendant (Rec., p. 246 *et seq.*), and by P. R. Thom, the same man who testified as to the machines at Kimberly (Rec., p. 323 *et seq.*).

Carter's Diagram No. 10 (Rec., p. 167 following p. 1084) purports to illustrate these machines and shows a pitch of four inches, which Carter assumes to have been used on them prior to Eibel.

The answers to this "prior use" are much the same as those to the others previously discussed. In the first place the existence of any pitch at all prior to Eibel's date is not established by any reliable evidence; second, the purpose of whatever pitch there was, and whenever it was put in, was admittedly mere drainage regulation, like the other prior art pitches. It embodied no hint or suggestion of the Eibel principle, and acted, during a large proportion of the operations on the machine, to increase instead of to diminish differences of velocity between stock and wire, and to create additional disturbance on the sheet instead of smoothing it out.

There is No Sufficient Evidence of any Pitch at all on these Machines Prior to Eibel.

Absolutely the only evidence of any pitch on these machines prior to Eibel's date is oral statements, more than fifteen years after the event, of LeValley and Thom. These statements are moreover mutually contradictory, for LeValley said that the pitch was six inches (Q. 20, Rec., p. 247), and he knew that it was six inches and not four inches (XQ. 145, Rec., p. 253); while Thom on the contrary said that it was four inches (Q. 48, Rec., pp. 326, 327).

There is not a scrap of *record* evidence produced, in the way of drawings, blocking, diary entries or anything else, nor is any effort made to explain their absence; nor is the man who is said to have put the blocking in, Lewthwaite (Qs. 50, 51, Rec., p. 327), called as a witness, or his absence explained.

The unreliability of such oral recollections long after the event is notorious, and the courts have uniformly held that they are not to be accepted as any proof of a prior use, as we have pointed out above (*supra*, pp. 75, 76).

This man Thom is the same man who testified in regard to the Kimberly-Clark machines at Kimberly, that a pitch of four inches was carried before Eibel's date, only to be flatly contradicted by defendant's other witness, Ross (*supra*, p. 197).

The fact probably is that the wires of these machines at Niagara were given a slight pitch for drainage regulation at about the same time the same thing was done to machines at the Kimberly mill of the same company, which, we we have shown, was at some time after the date of Eibel's application (*supra*, p. 198).

The Purpose of what Pitch there was, if Any, was Merely Drainage Regulation.

Whatever the pitch of these Niagara machines was, and whenever it was put in, it was a mere drainage adjustment, like that which was used at the Kimberly mills of this same company, which we have discussed above (p. 193). This is definitely admitted by both LeValley and Thom.

LeValley states it clearly when he says (Rec., p. 255) that it (the pitch) "rushed the water down to the dandy roll".

> "*X-Q.* 176. So as to get it drained properly at the dandy roll? *A.* To help drain the water."

Mr. Thom explained that the stock used at the Niagara Mills was very free stock (XQs. 223, 224, Rec., p. 340), and says that giving the wire a down-hill pitch carried "more volume of water" farther down the wire before draining off (XQ. 222, p. 340). He says (Q. 155, p. 334):—

> "This pitch arrangement helps the formation, because the water is carried a much farther distance on the travel of the wire, consequently that helps to make better formation."

What determined whether he used a pitch or not, and whether the wire should run up or down hill, was the character of the stock as to "quickness" or "slowness". We quote from his testimony (Rec., p. 343):—

> "*X-Q.* 268. The question that you considered, as to whether you should run with the wire below the level or above the level, and if above the level, how high above the level, was the character of the stock

as to quickness or slowness, was it? *A.* Yes, that is what determined the point."

It is definitely admitted, then, by both witnesses, that the purpose of the pitch was drainage regulation.

When one is using the Eibel principle, what determines the extent of the pitch is the relation between initial stock speed and wire speed. The greater the difference of velocity, the higher the pitch necessary to bring the stock up to speed equality with the wire. But Thom, being interested merely in drainage, according to his own testimony carried the same pitch for all the widely varying speeds at which the machines were run from time to time (ranging from 200 to 475 feet per minute) (XQs. 193, 195, 201–205, Rec., pp. 338, 339), his sole idea in using a pitch being to carry the water farther down the wire before it drained off, so as to get the stock to the dandy-roll at the desired consistency (XQ. 220, p. 340).

Any Pitch on these Machines Would Cause the Stock to Overrun the Wire.

These machines were run from time to time at a wide range of speeds, from as low as 200 feet per minute to as high as 475 feet per minute, depending upon the quality and weight of the paper being made (wrapping paper, manila or news). These were paper speeds, and the wire speeds, being less by about 8 per cent, would be from about 185 to about 435 feet per minute (*supra*, p. 93). They were run as much of the time on the low speeds as they were on the high speeds (XQs. 193, 195, 201–204, Rec., pp. 338, 339). Since the head carried behind the slices was 6 to 8 inches (XQ. 211, p. 339), say 7 inches, the stock when it entered upon the wires had a speed of

approximately 350 feet per minute (see Carter, Rec. p. 899).

This means that when the machines were being run at wire speeds of less than say 350 feet per minute (as they were half of the time), the stock entered upon the wire at speeds as great as or greater than the wire speed, and the presence of any pitch at all upon the wire would cause the stock to overrun the wire, and thereby operate in exactly the opposite manner from an Eibel pitch. The pitch would thus not only have no useful function, judged by the Eibel standard, but, in so far as so slight a pitch could have any effect at all, it would tend to create waves and ripples and do damage. There could not be a better illustration of the utter dissimilarity in theory and effect between these old drainage adjustments and the Eibel pitch.

And even when the machines were being run at the maximum wire speed, as assumed by Mr. Carter in his Diagram No. 10, of 435 feet per minute, no pitch was necessary for the Eibel purpose, because as defendant's witness Kinney says (Rec., p. 558, Qs. 104–107) a speed difference of 50 to 100 feet between stock and wire (in this case there would be at the maximum only about 85 feet) is perfectly consistent with good paper, the necessary acceleration of the stock to this extent being accomplished by drag alone without causing commotion too far down the wire.

Mr. Carter's Figuring Based on False Assumptions.

Mr. Carter works out some percentages regarding these Niagara machines which please him so much that he regards them as "excellent illustrations of just what the Eibel construction and mode of operation come down

to if the Eibel patent is to be applied to defendant's structure" (Rec., p. 919).

To make them such "excellent illustrations", however, he has, first, to neglect altogether the low speeds, although the pitch was used with the low speeds just as it was with the high; and he has, second, to assume a head behind the slices of *less than one-half what the testimony shows it to have been.* Thom testified that a head of 6 to 8 inches was used on these machines (XQ. 211, p. 339). Mr. Carter writes above his diagram (Diagram No. 10) the words "Head not stated" and assumes a head of "2–3" inches only, which gives an initial speed to the stock of only 210 feet per minute instead of about 350 feet per minute which it in fact had with the 6–8 inch head (*supra*, p. 213).

Thus, by making a false assumption, Mr. Carter conveniently avoids having to explain how any machine in which a pitch is used to increase instead of to decrease a difference of velocity between stock and wire, can be an "excellent illustration" of the Eibel principle.

It is entirely clear that these Niagara machines, even assuming all that defendant claims for them (which as we have seen is very far from proved), no more embodied an intelligent application of the Eibel principle than any of the other prior uses above considered.

Finally, we point out that the owners of these machines have *now* profited by Eibel's idea, and, since 1915 or 1916, have been using on them, not a trivial drainage adjustment, but a high pitch of 12 inches or more. (See Thom, Q. 81, p. 328; Ryan, XQs. 20–25, p. 348.) Mr. Thom was unable to inform us as to what speed is now being maintained on these machines (XQ. 210, Rec., p. 339), but no doubt their appropriation of the Eibel idea

has now enabled them to get large increases in production.

THE PALMER FALLS PRIOR USE.

This prior use relates to certain machines in the mill of the International Paper Company at Palmer Falls, New York.

This is one of the prior uses which were relied upon in the Remington-Martin case. The Court of Appeals dismissed it with the remark that it did not "merit discussion" (Pamphlet, p. 12; 234 Fed. 631), being not even of as much consequence as the five other prior uses which the Court did discuss.

When we say, in addition, that the International Paper Company, owner of these machines, immediately the Eibel invention became known, abandoned the trivial pitch now relied on as an anticipation of Eibel, put in high pitches on all its machines, 8 to 12 inches or more, took a license under the Eibel patent and has since paid many thousands of dollars royalty to the plaintiff for the use of the Eibel invention, we think the Court will agree that there is small need of discussing this prior use.

We shall, however, outline the facts, chiefly because we have here a splendid illustration of the utter barrenness of the prior art drainage adjustments of any germ of the Eibel invention.

At some date before Eibel, said to be 1897, the breast-roll ends of two of the machines (known as the Nos. 8 and 9) in these Palmer Falls mills (then owned by the Hudson River Pulp & Paper Company, but bought by the International Paper Company in 1898, Qs. 22–29, Rec., pp. 492, 493), were, it is said, blocked up enough so as to give the wires a downward pitch of 2 or 3 inches. Mr. Carter's Diagram No. 11 assumes it to have been 3 inches although defendant's witness Argy says that it

was 2½ inches (XQ. 323, Rec., p. 451). Some of defendant's witnesses, now well schooled in the Eibel principle, assert that the purpose of this trifling pitch was to bring about speed equality between stock and wire in the manner of the Eibel invention. It is entirely clear, nevertheless, that it had no such purpose or result, being merely another illustration of the numerous drainage adjustment of which we have seen so many instances. It utterly failed to suggest to those familiar with it the Eibel invention, which they eagerly adopted later on as soon as Eibel showed them how.

The Purpose was Drainage Regulation.

Ross' testimony is frank and clear that it was merely a drainage adjustment (Rec., p. 379): —

> "*X-Q.* 414. You say, then, it was a matter of drainage, giving the stock a longer or shorter time on the wire, or getting more or less water out, as the case may be? *A.* Yes, sir.
>
> *X-Q.* 415. And is it your understanding that that blocking you saw at Fort Edwards mill * was for the same purpose as these adjustments that were provided by the mechanism in the machines? *A.* That is my understanding."

Argy's testimony as to the purpose of the pitch is quite amusing. He said in his direct examination that the "purpose was in order to get the momentum, in order to have the paper the same speed as the wire" (Q. 56, Rec., p. 434). On cross-examination he said that the purpose was to "carry the water down", if you were dealing with

* When Ross testified about this matter he thought that the mill in question was located at Fort Edwards. He subsequently corrected his testimony to make it read "Palmer Falls". (See Q. 3, Rec., p. 418.)

a free stock (XQs. 300 to 301, Rec., p. 449), in other words, *drainage* regulation. On redirect examination, being told by counsel for the defendant that he had testified on direct examination that the purpose was to give the stock the speed of the wire and on cross-examination that the purpose was for drainage (RDQs. 353, 354, Rec., pp. 452, 453), he said that it was not for drainage (RDQ. 354, 355). Finally on recross-examination he said (RXQs. 374–376) that the purpose was in part drainage but that the real purpose of the pitch was to "*overcome the resistance of the air*", which is an amusing idea indeed, of which Argy is the sole inventor and advocate. The upshot of Argy's testimony is that he never did *and does not now* know anything about the true purpose or effect of the pitch.

Cunningham (p. 455 *et seq.*) and Hazel (p. 491 *et seq.*) try to convey the impression that this 2 or 3 inch pitch had the same purpose as an Eibel pitch, but the testimony of each of them contains many contradictions and inconsistencies.

High Pitches were Installed on the Palmer Falls Machines Later on as Soon as Eibel's Invention Became Known.

"Facts speak louder than words." The facts are that, until Eibel's invention became noised abroad and came to the notice of the operators of the Palmer Falls mill, they had no thought that it was possible or desirable to use any higher pitch than 2 or 3 inches, and they did not use even this insignificant pitch on any of the 7 other paper machines which they had at the same mill. All of these other 7 machines remained with their wires flat or even running up hill (Rec., p. 437, Q. 96; p. 501, Qs. 131, 132; p. 512, XQ. 344).

But when once the Eibel invention became known to the Palmer Falls people, and they learned that high pitches had been installed in accordance with it at the Berlin mills, the trivial 2½ inches was immediately abandoned and instead 14-inch pitches were put in on these same machines. Shortly thereafter (XQs. 302–309, Rec., p. 510; XQ. 211, p. 443) high pitches were adopted on all the other 7 machines; in some cases pitches of 6 to 8 inches (XQ. 222, p. 444), and in others as high as 16 inches (XQ. 357, p. 513) being installed. These high pitches have been used on these machines ever since, with large resulting increases in production.*

The adoption of the high pitch on these Palmer Falls machines is directly traceable to Eibel, although Hazel originally said erroneously in one of the passages above referred to that the high pitch was put in on their machines in 1904. It was copied from an Eibel installation at the Berlin mills, Berlin, New Hampshire, which was put in by the Eibel Process Company in January, 1907 (Bailey, XQs. 357–363, Rec. p. 543). Argy testifies as to this (Rec. p. 444):—

* Argy says at Q. 101, p. 437, that the No. 8 machine ran at 506 feet per minute and the No. 9 machine ran at 475 feet per minute before the high pitch was put in. The actual production records of the No. 8 machine for July, 1900, produced by Argy (Rec., p. 438, Q. 113) show, however, that either the paper at this speed was constantly breaking down, with resulting excessive stoppages of the machine, or else the speed could not have been over 400 feet per minute (Aldrich, Rec., p. 126, Qs. 29-31). And Kinney's contemporaneous memorandum of September 25, 1899, gives the speed of the No. 9 as 425 feet (XQs. 580-583, Rec., p. 593). Upon the putting in of the 14-inch pitch, the speed of the No. 8 was increased to about 560 or 575 feet per minute, and that of No. 9 to about 500 feet per minute (Hazel, Q. 138, p. 501). The increases of speed due to the high pitch on these machines were therefore at least 50 to 75 feet per minute and probably much more in the case of the No. 8.

"*X-Q.* 233. Now, do you know where they got their idea for raising, or putting in these high pitches at Palmer's Falls?

A. Why, they told me they heard it had been put in at Berlin, New Hampshire.

X-Q. 234. At the Berlin Paper Mills? *A.* They got their idea there no doubt."

He also says that it was "along 1907" when the high pitches were put in (XQ. 215, p. 443). Traveling paper makers brought the news about the Eibel invention, and said that the high pitch originated at Rhinelander (Eibel's mill) and that where it had been used "they had better success" (XQs. 237–243, Rec., pp. 444, 445).

Hazel, dealing with the same subject, the adoption of the high pitch at Palmer Falls in 1907—explains that he had "heard that they were pitching wires high. It was a general comment all through that section" (XQ. 320, Rec., p. 511). He remembers particularly that the high pitches had been put in at the Berlin mills and that the Great Northern Paper Company was pitching its wires at the same time (XQs. 321–323, Rec., p. 511). He, too, tells about how he "listened to traveling paper makers talking" about Eibel and his invention, and says that it was generally talked in the trade about 1907 (XQs. 331–332, Rec., p. 512).

Evidently, then, the two or three inch drainage adjustment, which had been in use at these mills some ten years prior to Eibel, did not teach nor suggest to owners or machine tenders that, by using a high pitch instead of an insignificant two or three inches, they could get largely increased production and better paper. It was Eibel who gave them this idea, and they were not slow to adopt it once they were shown how.

The owners of this Palmer Falls mills have, moreover, always recognized their indebtedness to Eibel, and have never for a moment contended that this drainage adjustment which they had used ten years prior to Eibel had any significance as against Eibel's patent. This owner, the International Paper Company, was one of the first to take a license under the patent (XQs. 405–407, Rec., p. 517; Q. 7, Rec., p. 36) and has paid to the plaintiff many thousands of dollars in royalties under the Eibel patent on its many machines.

The witness Hazel, too, is frank enough to admit that the early use of the slight pitch on these machines (which he says, erroneously, was four inches) did not as a matter of fact teach him the desirability of using a high pitch. Thus he testified (XQ. 467, p. 521):—

> "*X-Q.* 467. Did your experience with the No. 8 machine at Palmer Falls with the four inch pitch teach you the desirability of using the twelve inch pitch? *A.* No."

Argy makes the same admission, inferentially. He was in the Palmer Falls mills when the 2 or 3 inch pitch was put in by his uncle, and knew all about it. Subsequently he became superintendent of the Cliff paper mills at Niagara Falls, and some 5 or 6 years ago put in pitches on these machines. When asked how it happened that he put in these pitches for the Cliff Company, he answered (XQ. 194, Rec., p. 442):—

> "Why, I went out to Palmer, New York, on a visit, and I heard that they were raising their Fourdriniers, they had one machine I saw running on 8-inch pitch, they got very nice results and I came back and raised my machines immediately."

The use of the drainage adjustment in the Palmer Falls machines with which he had been familiar for ten years or more taught him nothing as to the desirability of using a higher pitch. This idea he got by seeing the high pitch which had been installed on these same machines, following and as a direct result of the Eibel invention.

The story in this case is typical of all the prior uses. Here we have a comparatively well authenticated case of the use of a 2 or 3 inch pitch prior to Eibel's date, and witnesses talk glibly about the purpose of the pitch being to bring about speed equality between stock and wire and increased speed. But the real purpose was drainage regulation only, and that there was no glimmer of the Eibel idea is proved by the subsequent history of the machines—the instant adoption on them of the high pitch, once the Eibel invention became known. This is the best kind of evidence that the early drainage adjustment was entirely barren of the Eibel principle.

It is idle for defendant, in the face of such a history as this, to argue that the Eibel high pitch was the same thing as, or a natural development from, the drainage adjustments of the prior art.

KING PAPER COMPANY PRIOR USE.

Mr. Carter includes among his diagrams (diagram No. 12; Rec., p. 169 following p. 1092) what purport to be machines made by the Beloit Iron Works for the King Paper Company in 1901 or 1902, which he assumes to have had a 4-inch pitch. The only evidence regarding these machines is the testimony of Ross, the Beloit Iron Works treasurer, who produced drawings of them. Ross testified originally that one of these machines was put in in 1901 with a 4-inch adjustment of the breast-roll above

the level, and another in 1902 with a 10-inch adjustment above the level (Qs. 205, 206, Rec., p. 365). We called upon him to produce the drawings of the machines (XQ. 390, Rec., p. 377), and *when he produced them he found that he made a slight mistake* in the date of the 10-inch machine; that whereas he had testified it was put in in 1902, it was not in fact until 1909, *two years after the Eibel patent had came out*, and, of course, as a result of the invention which Eibel had given the art (XQ. 483, Rec., p. 385).

And as to the alleged 4-inch adjustment on the 1901 machine, the drawings showed that Ross was exaggerating by about 100 per cent. He admitted (Q. 214, Rec., p. 365) that he never saw the machine actually using more than a 3-inch pitch, and finally admitted that the King machine did not have as great an adjustment of the breast-roll above the level as the Rhinelander machines referred to below (Rec., p. 386, XQ. 490; XQ. 573, p. 393; XQ. 640, p. 399), which Rhinelander machines, as we show below, he also finally admitted could not have had an adjustment of over 2 inches above the level (XQs. 518, 520, pp. 388, 389, *infra*, p. 228).

This was another trivial drainage adjustment like all the other "prior uses" (Ross, Rec., pp. 378, 379, XQs. 408–414).

This King machine was an exceedingly slow running machine, being adapted for paper speeds of only 30 to 225 feet per minute, as the contract under which it was built (Defendant's Exhibits Q, Q-1, Q-2) shows. (See also Carter diagram No. 12, Rec., p. 169 following p. 1092.) Even 4 inches of head would have given an initial stock speed of about 260 feet per minute (see Carter, Rec. p. 907), which is more than the maximum possible wire speed on this machine, and the slices were built for

a head of 8 inches which Mr. Carter assumes in his diagram No. 12. An 8-inch head would give an initial stock speed of 380 feet per minute. (See Carter, Rec. p. 909.) Any pitch at all would therefore inevitably have caused overrunning.

It is, therefore, for a very good reason that Mr. Carter refrains from doing any figuring as to percentages with regard to this machine.

THE NORTHERN PAPER COMPANY PRIOR USE.

Carter diagram No. 13 (Rec., p. 169 following p. 1092) purports to illustrate a machine of the Northern Paper Company at Green Bay, Wisconsin, with a wire pitch of 5 inches. This is the prior use which the Court of Appeals for the First Circuit says (Pamphlet, p. 45; 274 Fed. 545) "effectually disposes of" claims 7 and 8 of the Eibel patent, which call for a Fourdrinier paper machine having the paper-making wire declined from the breast-roll to the guide-roll, *and the several suction boxes arranged at a corresponding declination* but do not in terms say that the pitch shall be "substantial" or "high".

This same Northern Paper Company machine was relied upon by the defendant in the Remington-Martin case, and was much more fully discussed in that case than in the present case. In the Remington-Martin case the witnesses regarding it included Fogarty, the manager of the Northern Paper Company; Terp, the secretary and treasurer of that company; Schiebel, a beater-man employed by the company, and Larsen, a draftsman of the company which built the machine, the Beloit Iron Works.

In the present case the only evidence regarding the matter comes from Ross, treasurer of the Beloit Iron Works, who admits that he never measured the pitch on

the machine (XQ. 389, Rec., p. 377), and who knows next to nothing about it.

In the Remington-Martin case the Court of Appeals for the Second Circuit dismissed the matter with the remark (Pamphlet, p. 14; 234 Fed. 632) :—

> "The *most* that the evidence shows as to this use is that a pitch of not to exceed six inches was tried for two weeks or less and abandoned." (Italics ours.)

In the present case Ross started off by asserting that the machine had a breast-roll adjustment providing for raising the breast-roll "about *five* inches" above the level (Qs. 173, 174, Rec., p. 363).

We then called upon him to produce the drawings of the machine (Rec., p. 377, XQ. 390; Defendant's Exhibit R^3), whereupon he revised his estimate and said (XQ. 531, p. 390) that the possible elevation above the level was *four* inches. After further cross-examination he was constrained to conclude that the possible adjustment above the level was "about *three* inches" (RDQ. 713, p. 407). Being informed that his company's draftsman, Larsen, had testified in the Remington-Martin case that the possible adjustment was *less than two inches above the level and an inch and one-half below the level*, he said that without more information than he had he did not care to question the accuracy of Larsen's statement (XQs. 543–545, Rec., p. 391). Larsen's testimony to this effect is to be found in the Remington-Martin record (Vol. II, p. 242, XQ. 131).

This is a fair example of the accuracy of Ross' testimony, and indeed is typical of the worthlessness of any oral testimony on such a matter given long after the event and not based upon record evidence.

Ross further admitted that the adjustment, whatever it was, was merely for the usual purpose of drainage regulation. The Northern Paper Company was going to make tissue paper, which is a thin sheet from which the water drains very quickly, and a downhill adjustment would help to carry the water down to the dandy-roll (XQ. 538, Rec., p. 390). In other words, this is merely another illustration of the slight drainage adjustments of the prior art.

The Northern Paper Company machine was, moreover, a very slow speed machine, its speed not exceeding 300 or 350 feet and sometimes being as little as 125 (Remington-Martin Record, Vol. II, p. 260, XQ. 131; see Ross, Rec., XQs. 540, 541, p. 390). The head carried on the machine was about five inches (Remington-Martin Record, Vol. II, p. 275, XQ. 308; Vol. I, p. 114, Q. 7), (Carter, Rec. p. 909 under heading "Diagram No. 11"). which gives an initial stock speed of about 295 feet per minute. Therefore any pitch at all would necessarily have caused over-running of the stock on the wire at the average wire speeds and worked results directly opposite to those of an Eibel pitch.

As the passage quoted above from the opinion of the Court of Appeals for the Second Circuit indicates, the contention was made in the Remington-Martin case that at some time a pitch of six inches was carried on this Northern Paper Company machine (this having been made possible by putting blocking under the supports and making other changes in the machine), but it was admitted that this pitch was maintained only for a couple of weeks and "maybe not as long as that", and that it was then abandoned as a failure admittedly because it caused excessive over-running of stock on the wire and "made light and heavy spots across the ma-

chine" (Remington-Martin Record, Vol. II, p. 265, XQs. 197, 198).

As a matter of fact the claim that anything like six inches was used on this machine prior to Eibel's invention, even for two weeks, was conclusively disproved in the Remington-Martin case, and there is no such evidence in the present case, Ross' original statement of a five-inch pitch having been cut down, step by step, to less than two inches. The controlling point is, however, that whatever pitch was used, it was abandoned as a failure, as the Court of Appeals for the Second Circuit found.

As we should expect, in view of the disastrous results of the Northern Paper Company experiment, we find that after this machine was built in 1904, the Beloit Iron Works *never installed another paper machine having any adjustment at all on the breast-roll until the Eibel patent came out* (Ross, XQs. 392–396, Rec., p. 377; XQs. 616–618, p. 397), whereupon it fell into line with all the rest of the art, and began to use the high pitch (Rec., p. 378, XQs. 399–403).

THE PEJEPSCOT PRIOR USE

Defendant's expert, Mr. Carter, says that in his judgment the Pejepscot machines shown in his diagram No. 14 (Rec., p. 169 following p. 1092) are the closest approximation in the prior art to the operation of the defendant's machines (Rec., p. 921, XQs. 89, 90).

These Pejepscot machines, located at Pejepscot, Maine, are operated by the same company (Pejepscot Paper Company) that owns the Lisbon Falls machines referred to in a preceding section.

At the present time there is a five-inch pitch carried on these machines, and this five-inch pitch is assumed in Carter's diagram No. 14 and in his testimony to have been in use before Eibel's date.

As regards these machines, there is no evidence at all, either record or oral, except the statement of one witness (Dickinson). It is sufficient to say regarding the matter that *there is not one word to show that these machines ever had any pitch at all* (much less five inches) *prior to the date of Eibel's application*, in August, 1906, to say nothing of the earlier date of his invention, which defendant's own witness place as 1905 (*supra*, p. 169). Dickinson merely says that when he came to the Pejepscot mills, *"late in the fall" of 1906* (XQ. 184, Rec. p. 735), he found a two-inch or three-inch pitch on the wires and raised them up an inch or two more (Qs. 123–126, Rec., p. 732). Eibel's application was filed August 22, 1906, so that anything that happened "late in the fall of 1906" or thereafter is immaterial. Dickinson knows nothing whatever about these machines prior to that time (Qs. 120–122, Rec., p. 232).

Thus vanishes the "prior use" which Mr. Carter finds the closest approximation in the prior art to the defendant's machines. It was not a *prior* but a *subsequent* use. If the facts had been developed and it had appeared that there was any pitch at all on these machines prior to Eibel, we should undoubtedly have found it to be a mere trifling drainage adjustment like that on the Lisbon Falls machines.

RHINELANDER PAPER COMPANY PRIOR USE.

The Eibel invention was worked out by Eibel on the machines of the Rhinelander Paper Company, at Rhinelander, Wisconsin, while he was superintendent there.

These Rhinelander machines were built by the Beloit Iron Works, and they had the regular Beloit Iron Works breast-roll adjustment for drainage regulation, which allowed the breast-roll to be raised about 1¾ inches above the level, or dropped 1¾ inches below the level. In the

Remington-Martin case the defendant attempted to show that the adjustment on these machines allowed the breast-roll to be raised as much as 4½ inches above the level; but the effort failed, completely, and the Court of Appeals merely says as to Rhinelander that the prior use there did not "merit discussion" (Pamphlet, p. 12; 234 Fed. 631).

Defendant in the present case originally started out to prove the same thing, but the evidence so conclusively proved the contrary, that we do not find Rhinelander included among Carter's diagrams or mentioned in his testimony or in defendant's brief in the Court below.

Ross began by saying that the Rhinelander No. 1 machine had an adjustment capable of raising the breast-roll 5 inches above the level, and that the No. 2 machine had an adjustment capable of raising the breast-roll 3 inches above the level (XQs. 636–638, Rec., p. 399). But being confronted by the drawings of the machine he was compelled to admit that if the machines were set up in accordance with the drawings the utmost possible adjustment of the breast-roll above the level would be 1¾ inches (XQ. 650, p. 400; XQs. 519, 520, pp. 388, 389) with a similar adjustment below the level. Ross' testimony, therefore, fell flat, and defendant's other witnesses, Ludwig and Tomske, flatly contradicted his original statement, Ludwig testifying that the breast-roll could be raised about 1½ to 2 inches (Qs. 17–19, Rec., p. 297), and Tomske saying that it could be raised about 2 inches (Q. 48, Rec., p. 307).

In order that there might be no doubt about the matter we not only put in the actual drawings of the machines (see Vol. I, p. 149, Remington-Martin Record), but also took the testimony of Mr. Edmonds, who was manager of the Rhinelander Paper Company when the

machines were installed, and who testifies, and verifies his testimony by actual measurements, that the total amount of possible adjustment above the level on both machines was 1¾ inches, with a like adjustment below the level (Rec., p. 161, Qs. 16–18; p. 162, Qs. 26–29).

Evidently nothing further need be said about this Rhinelander prior use.

Ross admits that the purpose of these adjustments was drainage regulation (Rec., pp. 378, 379, XQs. 408–414).

INTERNATIONAL PAPER COMPANY, NIAGARA FALLS, PRIOR USE.

In the Remington-Martin case the defendant relied on an alleged prior use at the mills of the International Paper Company at Niagara Falls, New York. This was one of the prior uses as to which the Court of Appeals for the Second Circuit merely said that it did not "merit discussion" (Pamphlet, p. 12; 234 Fed. 631).

The defendant in the present case made an abortive effort to prove what the Remington-Martin Company failed to prove, and with such results that the matter was not found to "merit discussion" in defendant's brief in the Court below and Mr. Carter makes no reference to it in his diagrams or testimony.

The facts in the matter, however, so well illustrate certain points common to all the prior uses, that we wish to mention them.

Defendant's witnesses testifying about this prior use were Devine, Beyerl and Bowman.

Devine made the assertion that the wires on these machines were given a pitch, about 1900, of "from *four to six inches*" (Qs. 45–46, Rec., pp. 234, 235).

Beyerl made a similar assertion, saying that he visited this mill in the year 1902, and found the machines

blocked up to "a substantial pitch" which he estimated to be about six inches (Q. 139, Rec., p. 264; Qs. 202–212, pp. 268, 269). Beyerl was quite circumstantial about the date, placing it in June, 1902, because he was on his wedding trip at the time (Q. 204, p. 268).

The next witness on the matter was Bowman, who was at the mills as superintendent from 1899 to 1909. He testified on direct examination that about 1901 he gave these machines pitches of "just two and one-half inches" (Qs. 33, 34, Rec., p. 476); that they ran with this blocking until 1903 or 1904 when he raised them all to six inches (Qs. 56, 57, p. 478), and that in 1906 he raised them all up to 10 inches (Q. 63, p. 478).

He thus contradicted both Devine and Beyerl, who had said that there was six-inch blocking under the machines as early as 1902. Next he proceeded on cross-examination to contradict and disprove his own testimony. He was asked how he happened to put this six-inch pitch on these machines, and explained that "at that time there was a considerable talk around the country other people was raising the wires" (Q. 154, p. 483). Further questions developed the fact that the "other people" whose raising their wires caused him to raise his were the Berlin Mills at Berlin and Gorham, New Hampshire, and the St. Croix Paper Company (XQs. 155, 160, p. 483; XQs. 174–176, p. 484; RDQs. 279–282, p. 490).

Now the Berlin Mills' wires were level until high pitches were put in on them by the Eibel Process Company in January, 1907, as is proved by defendant's witness Bailey (Bailey, XQs. 357–363, Rec., p. 543); and the installation at the St. Croix Paper Company was another Eibel installation made subsequent to that at the Berlin Mills, in May, 1907 (Rec., p. 114, Q. 24).

Therefore, these 6 and 10 inch pitches of Bowman's at

Niagara Falls were *not prior to Eibel*, but *subsequent to Eibel*, and they were the direct result of Eibel's invention, the knowledge of which had spread to Niagara Falls.

Bowman's testimony further shows how far the use of a 2½-inch drainage adjustment was from suggesting the possibility or desirability of using a high pitch for the Eibel purpose. Bowman testifies that even after he knew that the wires of the St. Croix Mill were up to 21 inches, he did not dare to try so much as 10 inches, but tried 6 inches first to see whether it would work (XQs. 160–162, Rec., p. 483). He says (XQ. 214, p. 486) "*all the years I had been in business that was the first start of raising wires. I went at it gingerly.*"

There could not be stronger evidence that Eibel's high pitch was a new idea, radically different from, and not at all foreshadowed by, the trivial drainage adjustments of the prior art.

This vain effort by defendant to prove a prior use at Niagara Falls is important, not only because it shows how remote the drainage adjustments were from the Eibel invention, but also because it emphasizes the utter unreliability of oral recollection testimony long after the event, where there is no record evidence in support of it.

APPENDIX B.

THE INSTANCES OF ALLEGED HIGH SPEEDS PRIOR TO EIBEL.

In the body of this brief (pp. 51–54) we have summarized the facts as to certain machines alleged by defendant to have maintained speeds in excess of 500 feet per minute prior to Eibel. We here discuss them in detail.

The Pusey & Jones Machines at St. Croix Paper Company.

Defendant's witness Davis said that about 1904 or 1905 Pusey & Jones began to put out its so-called "New Century" shake machines, and that these machines ran "pretty close to 600 feet" per minute (Rec., p. 821, Q. 137). He said that a typical installation of this type of machine was that at the St. Croix Paper Company, of Woodland, Maine (p. 866, Qs. 215–218). This St. Croix machine, which was installed in the latter part of 1900 (Rec., p. 112, Q. 8), was at that time "*supposed to be the fastest machine in the world*" (Davis, Rec., p. 866, XQ. 219); and, according to Davis, ran at 575 feet per minute (p. 821, Q. 142).

Davis' statement as to the speed maintained by this machine was completely disproved by the testimony of the witness Talbot, superintendent of the St. Croix Paper Company, who helped install it and who has been with the company ever since (Rec., p. 112). Talbot testifies that when these machines (there were two of them just alike, Davis, Rec., p. 867, XQs. 227, 228; Talbot Rec., p. 112, Qs. 5–9; p. 113, Q. 17) were started up, the

were run at 420 feet a minute (Rec., p. 113, Q. 18), that they were subsequently speeded up as high as 535 feet (Rec., p. 113, Q. 19), but that at this speed they did not make satisfactory paper and *they had to reduce the speed to 500 feet per minute "to make paper good enough for the market"* (Rec., p. 118, Q. 71); and even to maintain the speed of 500 feet a minute they had to make the paper heavier than they wished to do (Rec., p. 118, Q. 73–76).

It therefore appears that this "fastest machine in the world" at the time when Eibel's invention was being put into operation at Rhinelander, was running at 500 feet a minute and could not make satisfactory paper at any higher speed.

As soon as the Eibel patent came out, this machine, and all the other St. Croix machines, were given pitches of 12 inches (Rec., pp. 113, 114, Qs. 23, 24). These were put in in 1907, and the reason they were put in was that—

> *"Mr. Ross, who was superintendent at that time, heard that over in Rhinelander, Wisconsin, they had pitched the wires and were getting a good sheet of paper by running faster, so he decided to pitch his."* (Rec., p. 114, Qs. 24, 25.)

As a result of these pitches put in in imitation of Eibel's Rhinelander installation, the speed of the machines was increased to 600 feet per minute, and later to 650 feet per minute (Rec., p. 114, Qs. 29–31). In other words, the Eibel pitch enabled this "fastest machine in the world" to increase its speed by more than 25 per cent.

Incidentally, defendant's witness Davis made the false assertion that with this "New Century" shake it was possible to raise the breast-roll 5 inches above the level (Rec.

p. 819, Q. 117), and he said that the St. Croix machine had this 5-inch adjustment (p. 866, XQs. 218–220. He was refuted by a letter from the president of the Pusey & Jones Company dated February 20, 1907, which says in so many words that the breast-roll adjustment of the New Century shake was 2 inches above the level or 2 inches below the level (p. 874, XQ. 310), and the testimony of Talbot is that the machine as built had a 1½-inch adjustment above and a 1½-inch adjustment below the level (Rec., p. 113, Q. 16). Accordingly, we find no mention of these Pusey & Jones machines among the alleged "prior uses" set up by defendant.

The St. Croix Paper Company is a licensee under the Eibel patent (Rec., p. 36).

Davis was unable to tell where any of the other "New Century" shake machines having these speeds "pretty close to 600 feet" were put in prior to 1907, with the exception of the St. Croix Paper Company. If he had been able to name any other instances we should undoubtedly have found states of fact similar to that existing with reference to the St. Croix machine.

The Bagley & Sewall Machine at Remington-Martin Company.

The Bagley & Sewall catalogue for 1905 (Dfts. Ex. T-2) shows a 100-inch machine (elsewhere referred to as the No. 1 machine) of the Remington-Martin Company, which was installed in 1902. The catalogue says that this machine has *"the world's record for speed"* (p. 27), and the illustration opposite page 27 says it is *"the fastest machine in the world"*. The catalogue claims that the machine started at a speed of 535 feet per minute, and later ran at 585 feet per minute regularly, and even that a speed of 618 feet per minute was reached and main-

tained (p. 27). In a letter from the Remington-Martin Company printed at page 75 of the catalogue a speed of 585 feet per minute is referred to.

Such advertising claims as these are naturally to be accepted with reserve. Let us see what the actual facts are with reference to this "fastest machine in the world".

In the first place, we find Mr. Lansing admitting that the 618 feet speed was maintained only for *two hours* and then abandoned (Rec., p. 649, Q. 24; Rec., p. 664, XQ. 161); but Lansing and Kinney say that the 585 feet per minute speed was regularly sustained (Kinney, Rec., p. 595, XQ. 614; Lansing, Rec., p. 664, XQ. 162).

Now, neither Lansing nor Kinney were in any way connected with the Remington-Martin Company, and their sole knowledge about the matter was hearsay, except that on one visit Lansing says he counted the speed (in October, 1904) and found it to be 566 feet per minute (Rec., p. 650. Q. 27). These witnesses were therefore not qualified to testify as to what speed was *regularly maintained* on this "fastest machine in the world" and no witness was offered by defendant who had any first-hand knowledge about it. But this was one of the machines charged and held to infringe in the *Remington-Martin* case, so that in that case there was first-hand evidence, presented by the owners of the machine about it. This came from A. R. Cowie, who was superintendent of the mill from October, 1903, to November, 1904 (Remington-Martin, Rec. Vol. II, p. 169, Q. 8), and he testified that when he left, the regular rate of speed for "the small machine", *i. e.*, this machine here in question, was *"about 485 to 490"*. He says that it "had been as high as 520, but not steady" (Remington-Martin Rec. Vol. II, p. 174, XQs. 48–50). The speeds referred to in the catalogue and the testimony of Lansing and Kinney all relate to the period *before Cowie left*, the Remington-Martin let-

ter mentioning the 585 feet having been dated October 15, 1904, and Lansing's count of 566 feet per minute having been made on October 25, 1904; while Cowie did not leave until November, 1904.

Cowie's evidence, therefore, proves that this "fastest machine in the world" was unable to maintain any such speed as 618 feet per minute, 585 feet per minute or 540 feet per minute, and that on the contrary its regular speed was 485 to 490 feet per minute.

The other Remington-Martin Company machine—the "big" 163-inch No. 2 machine—is also illustrated in the Bagley & Sewall catalogue at page 23, where it is said that this machine runs at 460 feet per minute.

These two Remington-Martin machines are the ones which were involved in the suit against the Remington-Martin Company and which were held to be infringements of the Eibel patent. In the Remington-Martin case it appeared (and it appears here) that their wires were running flat at the time the Eibel patent came out, and that shortly thereafter high pitches were installed, 20 inches on the small machine and 18 inches on the large machine. (See C. C. A. opinion, Pamphlet, pp. 9, 13; 234 Fed. 629, 631; see also Lansing, Rec. p. 660, XQ. 117; Kinney, Rec. p. 582, XQ. 440.) And as the evidence in the Remington-Martin Company case showed, after installing the Eibel pitch the small machine ran regularly at 575 feet per minute, and the large machines at 550 feet per minute. (See Kinney, p. 583, XQ. 450.) Comparing these figures with the speeds at which the same machines were run before with the flat wire, as stated by Cowie, it will be seen that by the use of the pitch the regular speed on the small machine was increased from 485 or 490 feet to 575 feet (*i. e.*, about 90 feet, or a little less than 20 per cent), and that the regular speed on the large ma-

chine was increased from 440 feet to 550 feet per minute, that is, 110 feet or 25 per cent.

The Bagley & Sewall Machines at Berlin Mills.

These were four machines installed by the Bagley & Sewall Company for the Berlin Mills Company in the year 1904 (Kinney, Rec., p. 579, XQs. 393, 394).

Mr. Lansing, in a signed article in the "The Paper Mill" of February 10, 1906 (Defs. Ex. T-6, Rec. following p. 1086), says of this Berlin Mills installation that "we consider it *the banner installation of the world";* and the Bagley & Sewall catalogue (Defs. Ex. T-2, p. 15) speaks of the 40 tons daily production of each machine as "the wonderful amount of the production".

Mr. Lansing made a visit to the Berlin mills to see these machines on October 28, 1904, and made this entry in his diary:—

> "*Morning, at mill, grand sight. 475 feet.*" (Rec., p. 655, Q. 74.)

A production of 40 tons per day on one of these machines corresponds to a paper speed of 425 feet per minute only, as defendant's witness Kinney admits (Rec., p. 581, XQs. 416-419), which shows that the sight was unusually "grand" that day.

These Berlin machines had no breast-roll adjustment whatever except a slight amount below the level (Kinney, Rec., p. 580, XQ. 398).

Thus, we find that this "banner installation of the world" was running *with its wires level at 425 feet per minute.*

And we further find that the Berlin mills were (outside from the Rhinelander mills, where the pitch was first adopted) the first mills to adopt the Eibel pitch,

pitches of 11 to 14 inches having been installed for them by the owners of the Eibel patent in January, 1907, as defendant's witness Bailey testifies (Rec., p. 543, XQs. 357–363; Kinney, Rec., pp. 582, 583, XQ. 440).

As a result of the installation of the Eibel pitch, the production on the machines of this "banner installation of the world" was increased from *40 tons a day to 50 tons a day* (Kinney, Rec., p. 583, XQ. 445; p. 597, RDQ. 632). The result of the application of the Eibel invention to this "banner installation of the world" was therefore to increase its output by 25 per cent. Ever since that date the Berlin Mills Company has operated under a license under the Eibel patent (Rec., p. 36).

The Bagley & Sewall Machines at Laurentide Paper Company.

Another of the "galaxy of record breakers" referred to in the Bagley & Sewall catalogue (Deft's. Ex. T-2) is the 100-inch machine of the Laurentide Paper Company, which is shown at page 29 and referred to in a letter printed at page 31 of the catalogue. The catalogue says that this machine "*has speed power beyond belief*", that it started at the "phenomenal starting speed of 503 feet per minute", and that it ultimately reached 553 feet per minute. The letter printed at page 31 speaks of this "wonderful speed".

Here again there was no competent evidence offered by defendant as to what speeds were regularly maintained upon this machine, the only evidence being these advertising claims and Lansing's testimony that on October 25, 1904, he made a visit to the Laurentide Company and counted the speed of the machine as 552 feet (Lansing, Rec. p. 650, Qs. 30, 31). Nevertheless, Mr. Lansing took the responsibility of saying that this speed

was "maintained and even increased" (Rec., p. 664, XQ. 160).

But it happened that we were able to find record evidence to show just how fast this machine did run, and the witness John Glenn, foreman of the Laurentide Company, who has been familiar with the machine since it was installed, produced those records, which show the speeds maintained on it for the years just prior to Eibel's patent, 1905 and 1906. The pertinent parts of these records are quoted at Rec. page 105.

Glenn testifies that the machine was originally started up at a speed about 550 feet, and "it ran for a short time and then we slowed down" because "*the paper wasn't satisfactory*" (Rec., p. 104, Qs. 11–13), to speeds of 475 or 500 feet. The records prove that his testimony is correct. They show that during the year 1906, just before the Eibel patent issued, the prevailing speed was about 475 feet per minute, and only during one month in that year did it reach as much as 500 feet per minute and never during the year did it exceed that figure.

The machines had a 1¼-inch drainage adjustment (Rec., p. 578, XQ. 381), but this was not used and the wire was run level (Rec., p. 108, XQs. 52–58).

This "record breaker", therefore having "speed power beyond belief" was making paper with a flat wire at the time the Eibel patent came out at 475 to 500 feet per minute. Higher speeds had been tried on it but it had been found that the paper made at higher speeds was not satisfactory, and "*they had to throw away a lot of the paper because it wasn't right and work it over*" (Rec., p. 110, XQ. 79). They "tried to run as fast as we could, but could go so far and no farther" (Rec., p. 107, XQ. 33).

But as soon as the Eibel patent came out and the re-

port of Eibel's success spread, this machine, like all the rest of which we have heard, was straightway given a high pitch, of 11–14 inches (Lansing, Rec., p. 660, XQ. 117; Kinney, Rec., p. 582, XQ. 440; Glenn, Rec., p. 106, Qs. 22, 25, 26); and as a result of this pitch the machine now runs at *620 feet per minute* and makes good paper (Glenn, Rec., p. 106, Qs. 23, 24)—that is to say, the Eibel pitch gave this "record breaker" with "speed beyond belief" an increase in its regular speed of 125 to 150 feet per minute, or about 25 per cent. This increased rate of speed was obtained purely as a result of putting in the pitch (Glenn, Rec., p. 106, Q. 28), no other changes whatever having been made in the machine (Rec., p. 107, XQs. 35–41). The Laurentide Company is a licensee under the patent (Rec., p. 36).

The other Laurentide machines have been given even greater increases of speed as a result of adopting the Eibel pitch. They were running at about 450 feet per minute or less prior to Eibel (Rec., pp. 106, 107, XQs. 32–34) and they, too, following Eibel, were given substantial pitches (Rec., p. 106, Q. 27), and now they also run at the same speed as the machine of the catalogue (Rec., p. 110, XQ. 77), that is to say, at 620 feet per minute. These other machines, therefore, have had their speeds increased by virtue of the Eibel pitch 170 feet per minute or more, an increase of *over 35 per cent.*

The Pusey & Jones Machine at Palmer Falls.

This we have discussed above, among the prior uses (*supra*, p. 215). It was said to have had a speed of 506 feet per minute in 1898, but if it did run at that speed it is clear that it was run very irregularly, with many breakdowns, for the production records produced by defendant's witness Argy (Rec. p. 438, Qs. 113–117) for

July and August, 1900 (the only such records in the case regarding it), show that the actual production on the machine corresponds to a maintained speed of only about 400 feet per minute (Aldrich, Rec. pp. 126, 127, Qs. 30, 31).

In 1907 the news of the Eibel installations at Rhinelander and at the Berlin mills reached Palmer Falls and the trivial 2½-inch pitch which had been in use for drainage regulation on this machine was instantly abandoned and high pitches of 8 to 16 inches put in on this and all the other Palmer Falls machines, whereupon the speed of this machine was raised to 560 or 575 feet per minute (*supra*, pp. 217–219).

The International Paper Company, owner of the Palmer Falls machines, was one of the first to take a license under the Eibel patent (XQs. 405–407, Rec., p. 517; Q. 7, Rec., p. 36).

The Pusey & Jones Machines at Willamette Pulp & Paper Company.

Defendant's witness, Davis, tells about certain Pusey & Jones machines of the "Defender" type which he says ran at 500 feet per minute and he names four such machines as to which the sales-department had a "talking point" of the 500 feet speed, which were placed respectively at Willamette Pulp & Paper Company (now Crown-Willamette Company), at Hudson River Pulp & Paper Company (now owned by International Paper Company), at Glens Falls Mill of International Paper Company, and at the Glen mill of the International Paper Company (Rec., p. 817, Qs. 69, 70, 76; p. 818, Qs. 91–94; p. 866, XQs. 207–209; p. 877, XQ. 344). These are evidently the same four machines listed in "Weeks' History of Paper Manufacturing" (quoted by Carter at Rec., p. 918).

As to the Willamette machine, alone of the four, there is available evidence to show what the actual facts, as distinguished from sales department "talking points" were. This was one of the machines as to which "prior use" evidence was taken in the Remington-Martin case, and as the Court of Appeals found in that case, when the Eibel patent issued, the best speed being maintained on any of the Willamette machines was 400–450 feet per minute (Pamphlet, pp. 12, 13; 234 Fed. 631). Upon the issuance of the Eibel patent the common history was repeated at Willamette. As the Court of Appeals in the Remington-Martin case said: —

> "On August 4, 1907, about 5 months after the issue of the Eibel patent, the wires were elevated on the various machines from 8 to over 20 inches, with a resultant increase of speed from 400 or 450 feet to from 500 to over 680 feet." (Pamphlet, p. 12; 234 Fed. 631.)

This particular Pusey & Jones machine * had its speed increased as a result of the installation of the Eibel pitch to 640 feet per minute, an increase over its previous speed of about 190 feet *or 40 per cent.*

Not only the Willamette machines but also the other three named by Davis, two of which are owned by the International Paper Company and one by the Berlin mills, are now licensed under the Eibel patent (Rec., p. 36).

* This was the No. 5 machine (Remington-Martin Rec. Vol. II, p. 293) and after the pitch was put in its speed was 640 feet (Remington-Martin Rec. Vol. II, p. 38, XQ. 280).

The Bagley & Sewall Machines at St. Regis Paper Company.

The Bageley & Sewall catalogue (Defts. Ex. T-2) also refers to some "record breakers" at the St. Regis Paper Company which the catalogue says (p. 25) ran at 525 feet per minute. This was apparently a little optimistic, since all that the St. Regis Company itself claimed in its letter to the Bagley & Sewall Company (Defts. Ex. T-10) was that they were running at "from 435 feet to 502 feet per minute", at which speeds "they are producing, for their inches, *more paper than any other four machines in the world*".

The breast-roll adjustment provided in these machines is about 1¼ or 1½ inches (Rec., p. 578, XQ. 381).

In 1907, following Eibel's disclosure, high pitches were adopted on all of these St. Regis machines (Rec., p. 660, XQ. 117; p. 582, XQ. 440); and now they are running with pitches of 10 inches, under license under the Eibel patent (Aldrich, Rec., p. 36; Hazel, p. 521, XQ. 468), and are making speeds of 575 feet per minute (or at least they were when Kinney measured their speed in August, 1916 (Rec., p. 573, XQ. 307). Hall, in the Remington-Martin case, testified (Vol. II, p. 218, XQs. 101–107) that some of these machines are running as high as 580 feet per minute.

These four machines, then, which according to their owner's claim were, prior to Eibel, "*making more paper than any other four machines in the world*" of their size, were able, by adopting Eibel's invention, to increase their speeds by anywhere from 75 to 145 feet per minute.

The Bagley & Sewall Machine at Raymondville Paper Company.

Another machine referred to in the Bagley & Sewall catalogue (Dfts. Ex. T-2), and in the testimony of Kinney and Lansing is the 112-inch machine at the Raymondville Paper Company, which the catalogue (p. 33) characterizes as "the most productive machine in the world". There is no statement in the catalogue (nor any evidence at all) as to the regular speed of this machine, although the words "540 per feet minute" are printed in large letters. But the preceding words in small letters are "*which has rarely been run to exceed*". Presumably this machine was run at about the same rate as the Laurentide machine,—475 to 500 feet per minute.

One thing we know, and that is that as soon as the Eibel invention became known to the Raymondville Company this machine (which had previously had a minute drainage adjustment of 1½ inches above and 1½ inches below the level (Rec., p. 657, XQs. 90–92) was given a high pitch of 12 inches (see Lansing, Rec., p. 660, XQ. 117), and that this was done after the Raymondville people heard traveling paper makers telling about the Eibel invention and read about it in the "Paper Trade Journal". (See Remington-Martin Rec. Vol. II, p. 203, XQs. 242–246.)

These Raymondville machines are operating under license from the plaintiff and paying royalties for the use of the pitch * (Rec., p. 36).

* The Raymondville Company is one of the group of companies which some years ago were merged into the "Remington Paper & Power Company" (Rec., p. 637, Q. 9; p. 645, XQs. 88-92).